

# DRIVE SHAFT SYSTEM

***DS***

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# General Description

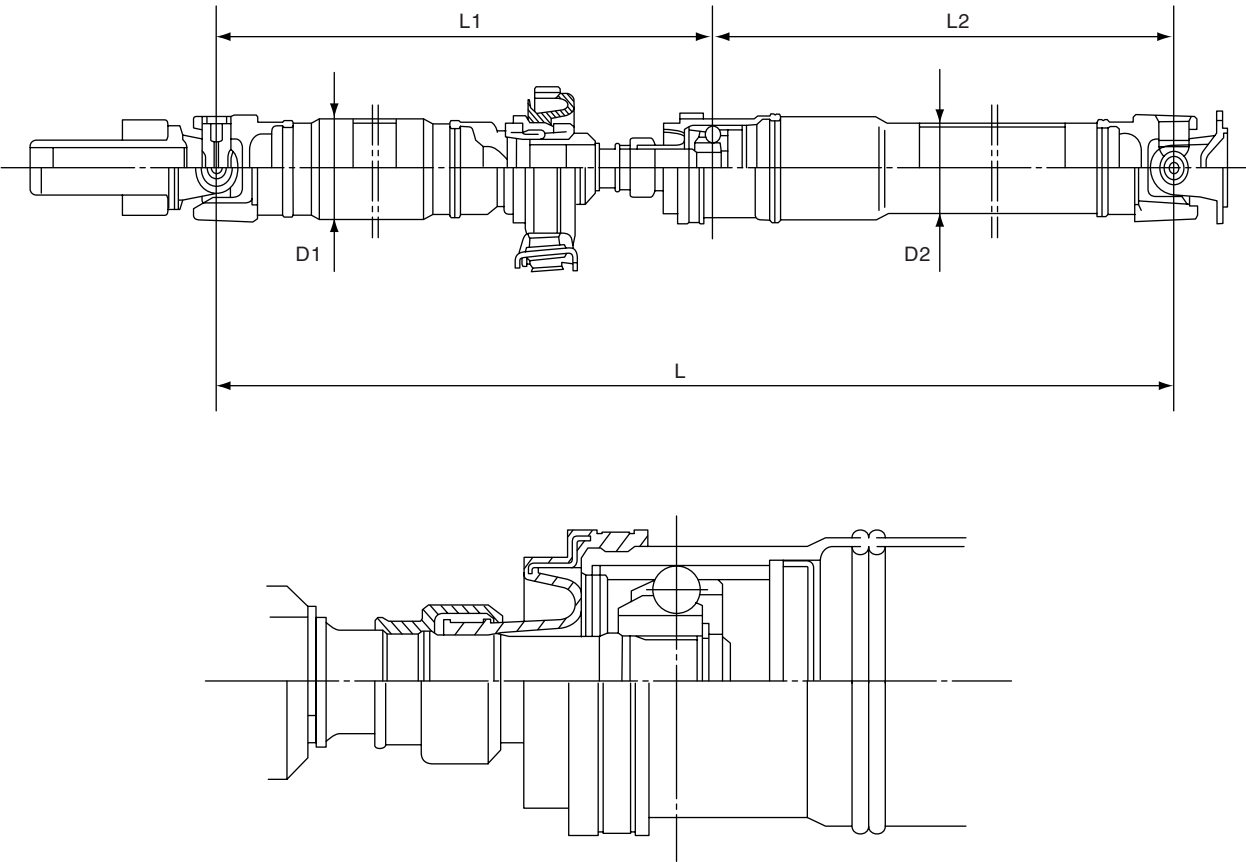
## DRIVE SHAFT SYSTEM

### 1. General Description

#### A: SPECIFICATION

##### 1. PROPELLER SHAFT

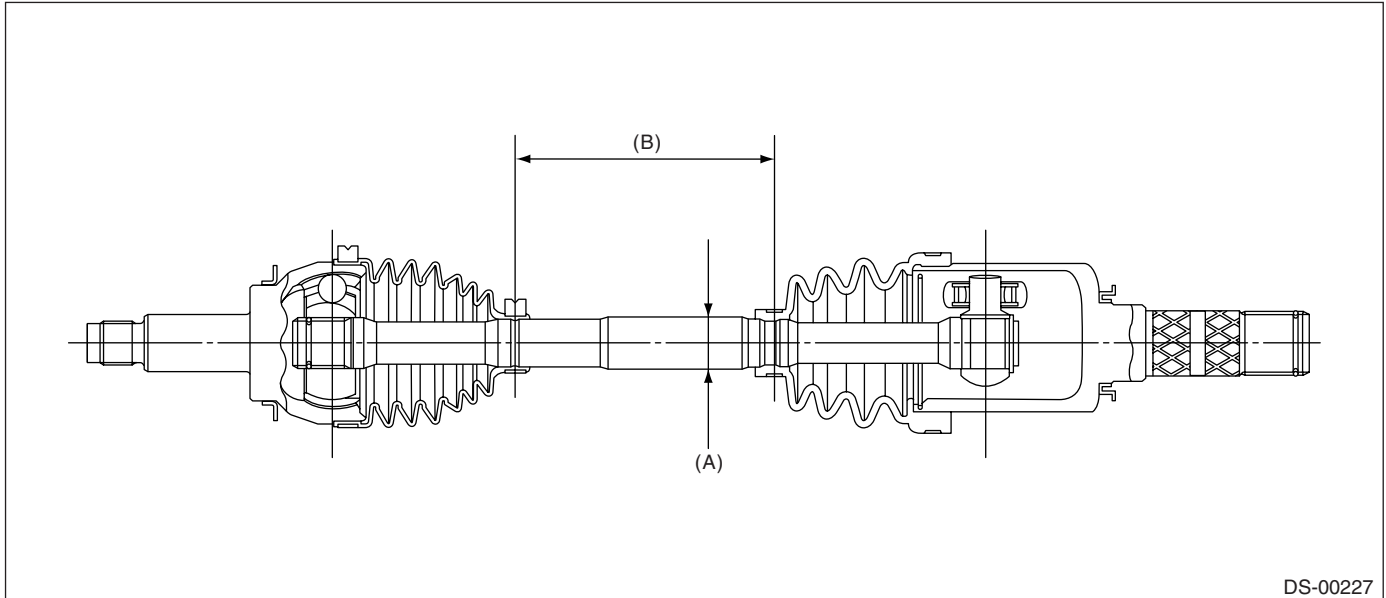
| Model                                                       |                | 5MT           | 4AT           | 5AT           |
|-------------------------------------------------------------|----------------|---------------|---------------|---------------|
| Propeller shaft type                                        |                | EDJ           |               |               |
| Propeller shaft length: L                                   | mm (in)        | 1,490 (58.66) | 1,430 (56.30) | 1,317 (51.85) |
| Front propeller shaft Joint-to-joint length: L <sub>1</sub> | mm (in)        | 735 (28.9)    | 675 (26.6)    | 562 (22.1)    |
| Rear propeller shaft Joint-to-Joint length: L <sub>2</sub>  | mm (in)        | 755 (29.7)    |               |               |
| Outer diameter of tube:                                     | D <sub>1</sub> | 63.5 (2.50)   |               |               |
|                                                             | D <sub>2</sub> | 57.5 (2.26)   |               |               |



DS-00226

### 2. FRONT DRIVE SHAFT ASSEMBLY

| Model     | Type of drive shaft | Axle diameter $\phi$ D mm (in) | Axle length L mm (in) |
|-----------|---------------------|--------------------------------|-----------------------|
| Apply all | EBJ87+PTJ82         | 26 (1.0)                       | 349.6 (13.76)         |



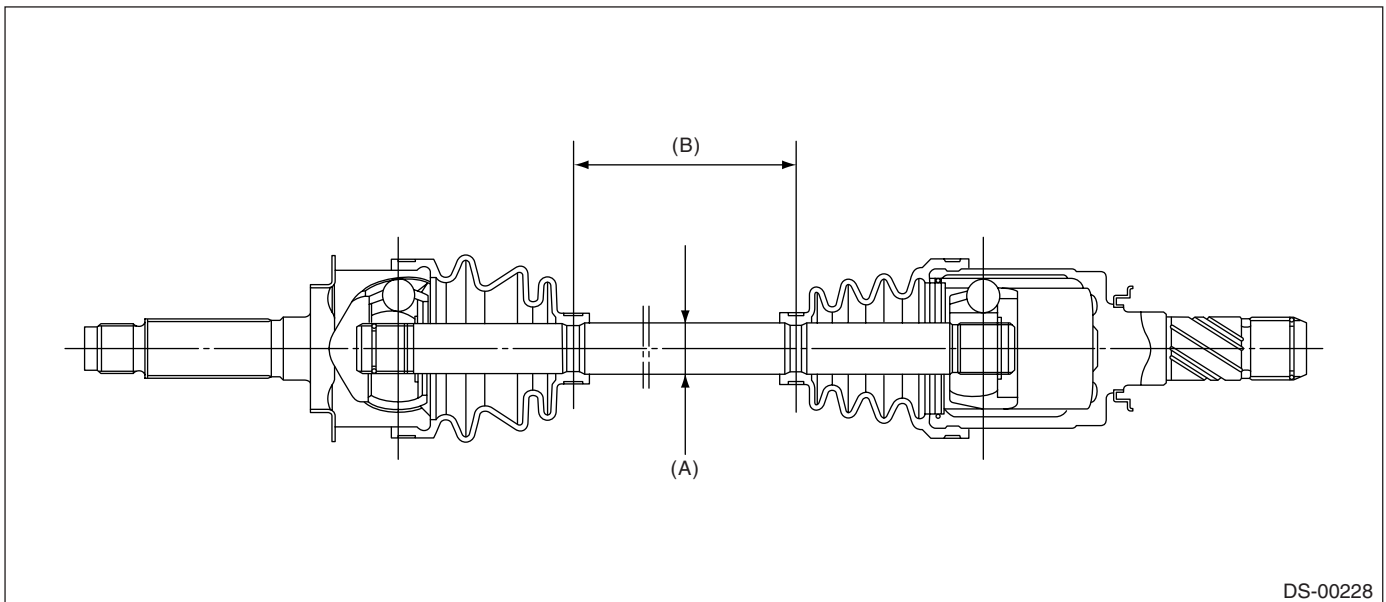
DS-00227

(A) Axle diameter

(B) Axle length

### 3. REAR DRIVE SHAFT ASSEMBLY

| Model               | Type of drive shaft | Axle diameter $\phi$ D mm (in) | Axle length L mm (in) |
|---------------------|---------------------|--------------------------------|-----------------------|
| 2.5 i AT            | BJ75+DOJ75          | 22 (0.87)                      | 366.5 (14.43)         |
| Except for 2.5 i AT | EBJ82+DOJ79         | 22 (0.87)                      | 375.1 (14.77)         |



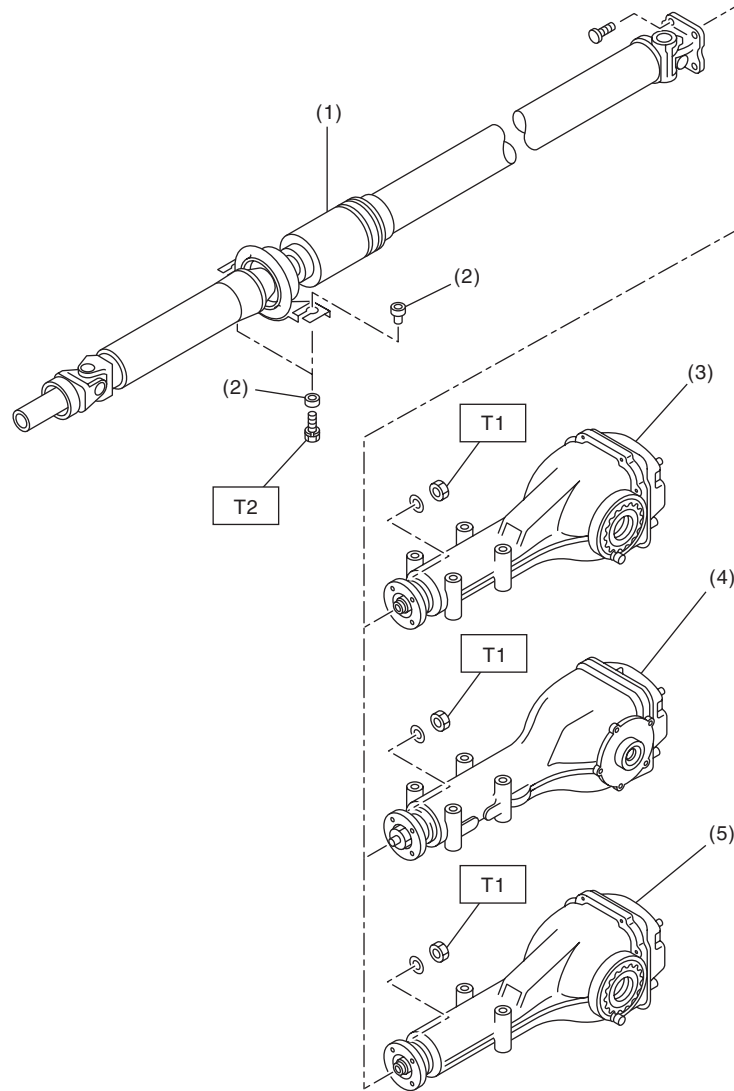
DS-00228

(A) Axle diameter

(B) Axle length

### B: COMPONENT

#### 1. PROPELLER SHAFT



DS-00229

- (1) Propeller shaft
- (2) Bushing
- (3) Rear differential (VA1-type)

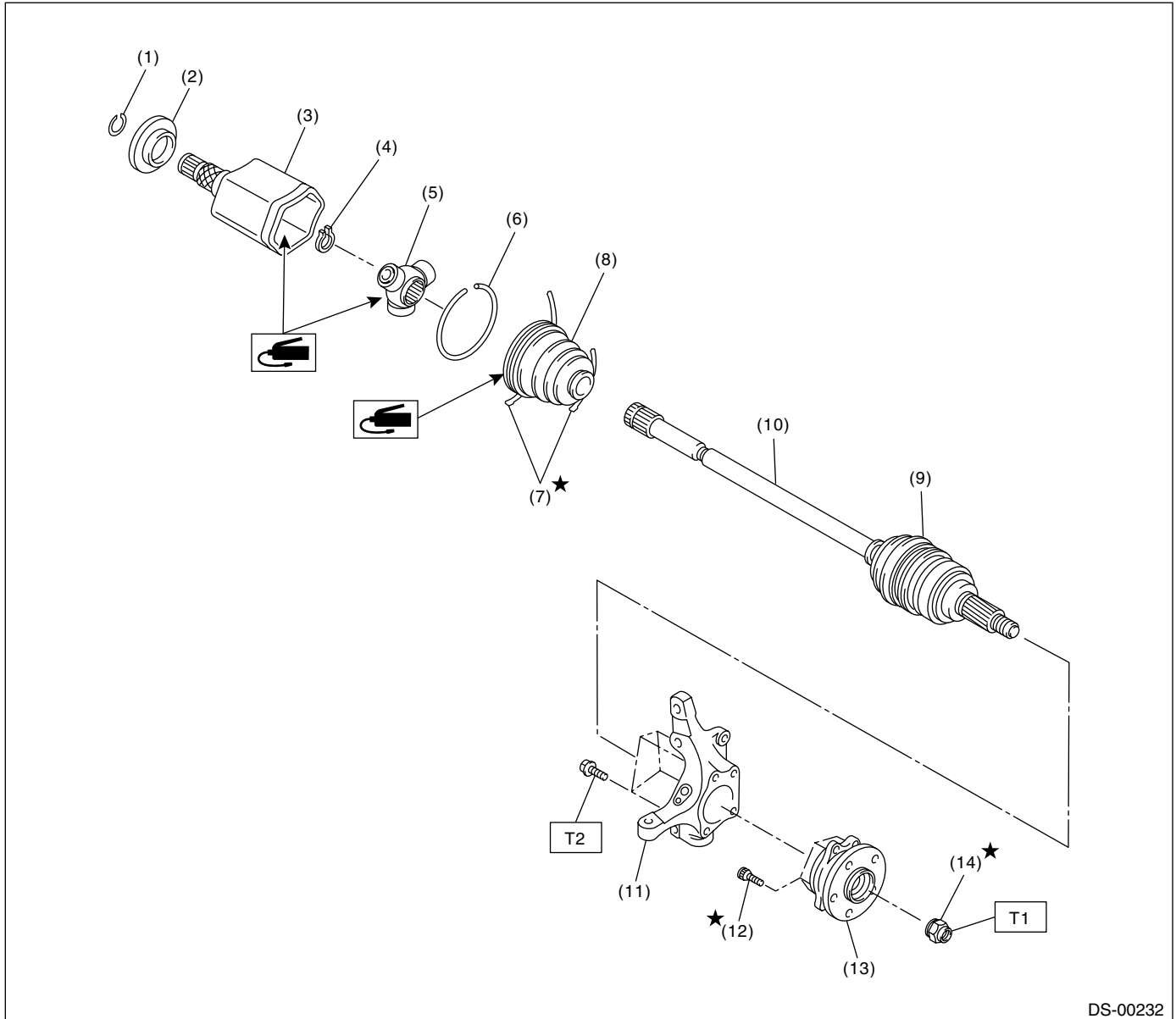
- (4) Rear differential (T-type)
- (5) Rear differential (VA2-type)

**Tightening torque: N·m (kgf-m, ft-lb)**

**T1: 31 (3.2, 23.1)**

**T2: 52 (5.3, 38.3)**

## 2. FRONT AXLE



DS-00232

- (1) Circlip
- (2) Baffle plate
- (3) Outer race (PTJ)
- (4) Snap ring
- (5) Trunnion
- (6) Snap ring

- (7) Boot band
- (8) Boot (PTJ)
- (9) Boot (EBJ)
- (10) EBJ shaft ASSY
- (11) Housing
- (12) Hub bolt

- (13) Front hub unit bearing
- (14) Axle nut

**Tightening torque: N·m (kgf-m, ft-lb)**

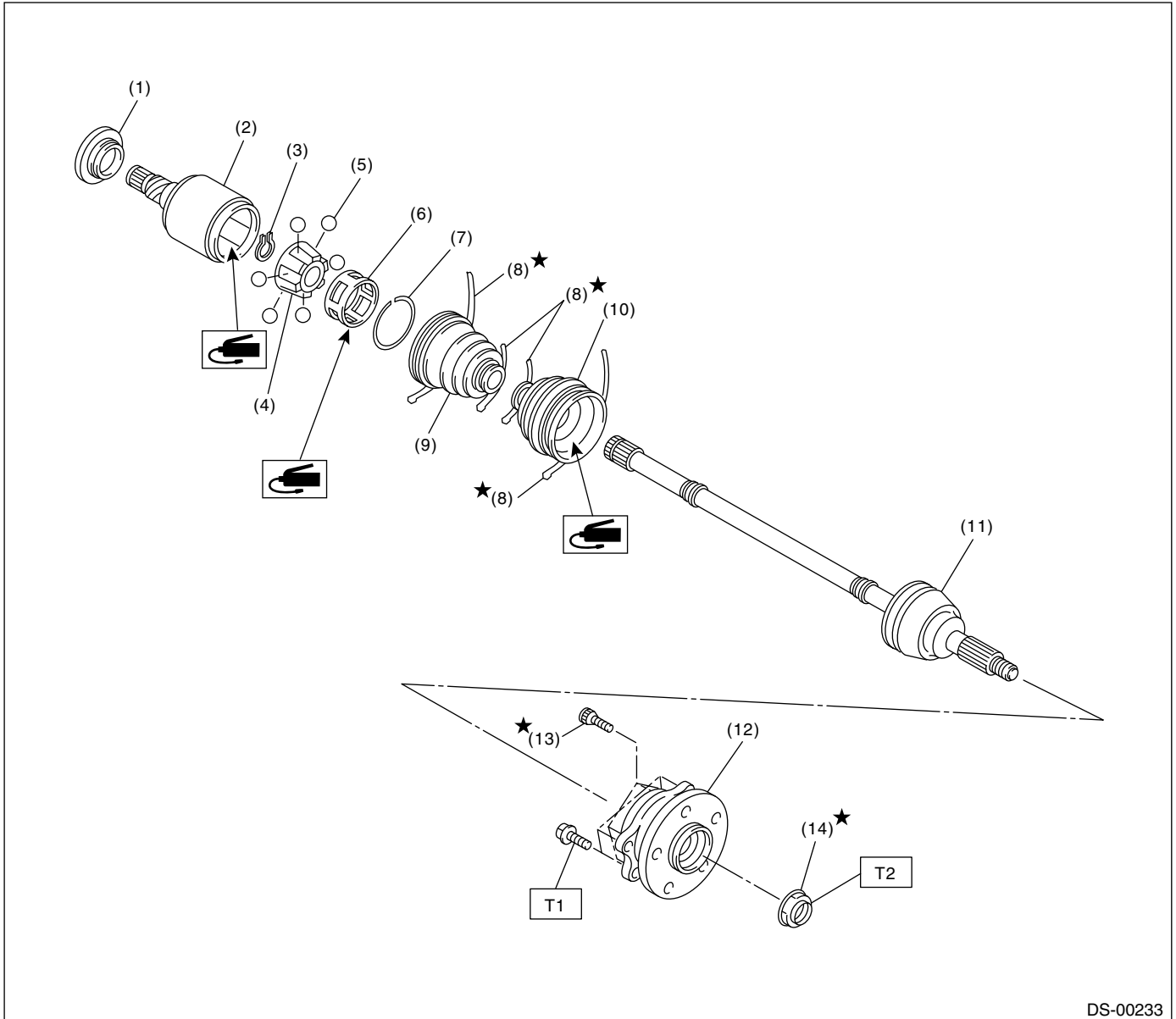
**T1: 220 (22.4, 162)**

**T2: 65 (6.6, 47.9)**

# General Description

## DRIVE SHAFT SYSTEM

### 3. REAR AXLE



- (1) Baffle plate (DOJ)
- (2) Outer race (DOJ)
- (3) Snap ring
- (4) Inner race
- (5) Ball
- (6) Cage
- (7) Snap ring

- (8) Boot band
- (9) Boot (DOJ)
- (10) Boot (BJ)
- (11) BJ shaft ASSY (2.5 i AT model)  
EBJ shaft ASSY (Except for 2.5 i AT model)
- (12) Rear hub unit bearing

- (13) Hub bolt
- (14) Axle nut (olive color)

**Tightening torque: N·m (kgf-m, ft-lb)**

**T1: 65 (6.6, 47.9)**

**T2: 240 (24.5, 177)**

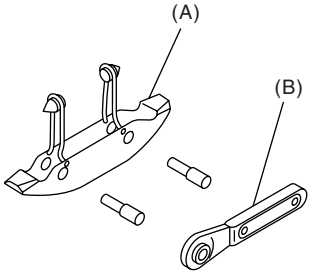
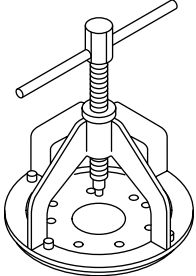
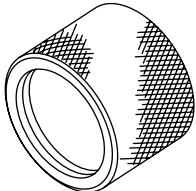
## C: CAUTION

- Wear work clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Be careful not to burn yourself, because each part on the vehicle is hot after running.

- Use SUBARU genuine grease etc. or the equivalent. Do not mix grease, etc. with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply grease onto sliding or revolution surfaces before installation.
- Before installing snap rings, apply sufficient amount of grease to avoid damage and deformation.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.

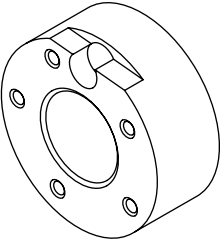
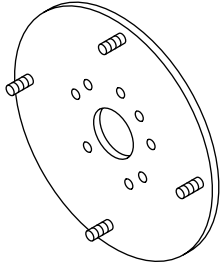
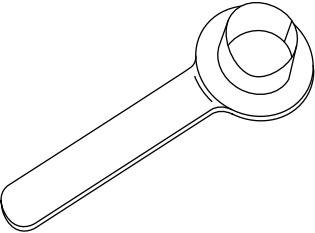
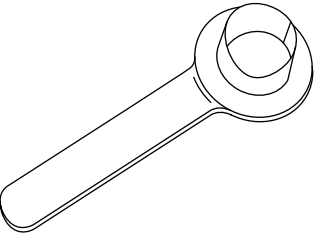
## D: PREPARATION TOOL

### 1. SPECIAL TOOL

| ILLUSTRATION                                                                                            | TOOL NUMBER | DESCRIPTION                          | REMARKS                                                                  |
|---------------------------------------------------------------------------------------------------------|-------------|--------------------------------------|--------------------------------------------------------------------------|
|  <p>ST-925091000</p>  | 925091000   | BAND TIGHTENING TOOL                 | Used for tightening boot band.<br>(A) Jig for band<br>(B) Ratchet wrench |
|  <p>ST-926470000</p> | 926470000   | AXLE SHAFT PULLER                    | Used for removing axle shaft.                                            |
|  <p>ST18675AA000</p> | 18675AA000  | DIFFERENTIAL SIDE OIL SEAL INSTALLER | Used for installing differential side retainer oil seal.                 |

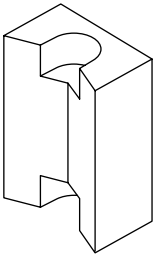
# General Description

## DRIVE SHAFT SYSTEM

| ILLUSTRATION                                                                                            | TOOL NUMBER | DESCRIPTION                | REMARKS                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------|-------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>ST-927080000</p>   | 927080000   | HUB STAND                  | Used for assembling hub bolt in hub.                                                                                                                   |
|  <p>ST-927140000</p>   | 927140000   | AXLE SHAFT<br>PULLER PLATE | Same as plate 2 included in AXLE SHAFT<br>PULLER (926470000).                                                                                          |
|  <p>ST28099PA090</p> | 28099PA090  | OIL SEAL PROTEC-<br>TOR    | <ul style="list-style-type: none"> <li>• Used for installing rear drive shaft into rear differential.</li> <li>• For protecting oil seal.</li> </ul>   |
|  <p>ST28399SA010</p> | 28399SA010  | OIL SEAL PROTEC-<br>TOR    | <ul style="list-style-type: none"> <li>• Used for installing front drive shaft into front differential.</li> <li>• For protecting oil seal.</li> </ul> |

## General Description

DRIVE SHAFT SYSTEM

| ILLUSTRATION                                                                                                                      | TOOL NUMBER                      | DESCRIPTION | REMARKS                       |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------|-------------------------------|
|  <p style="text-align: center;">ST28399AG000</p> | 28399AG000<br>(New adopted tool) | HUB STAND   | Used for extracting hub bolt. |

### 2. GENERAL TOOL

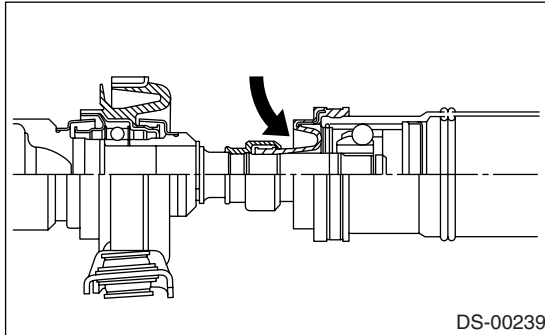
| DESCRIPTION   | REMARKS                                        |
|---------------|------------------------------------------------|
| Puller        | Used for removing ball joint from knuckle arm. |
| Dial gauge    | Used for inspecting propeller shaft run-out.   |
| Extension cap | Used for preventing leak of gear oil or ATF.   |
| Bar           | Used for extracting drive shaft.               |

## 2. Propeller Shaft

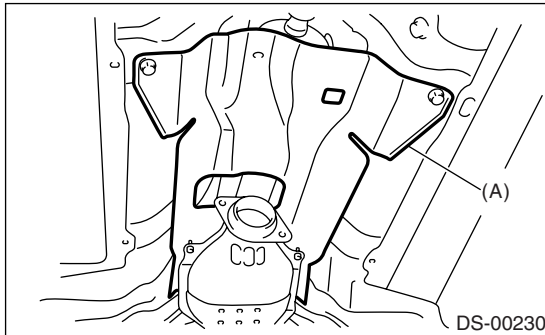
### A: REMOVAL

#### NOTE:

- Before removing propeller shaft, wrap metal parts with a cloth or rubber material.
- In case of DOJ type, before removing propeller shaft, wrap metal parts (installed at the rubber boot of center DOJ) with a cloth or rubber material, as shown in the figure. Rubber boot may be damaged due to interference with adjacent metal parts while bending the DOJ during removal.

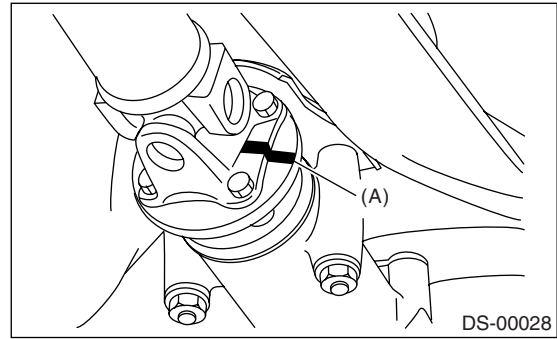


- 1) Disconnect the ground cable from battery.
- 2) Shift the select lever or gear shift lever to neutral.
- 3) Release the parking brake.
- 4) Lift-up the vehicle.
- 5) Remove the center exhaust pipe.
- 6) Remove the rear exhaust pipe and muffler.
- 7) Remove the heat shield cover.



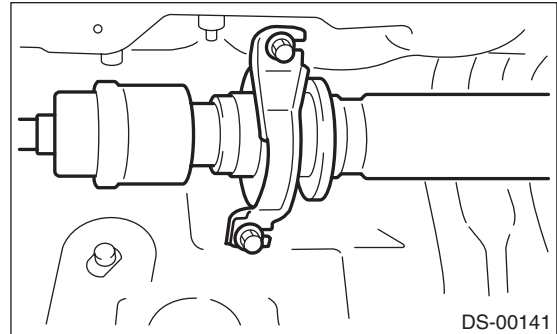
(A) Heat shield cover

- 8) Make matching marks on the flange yoke and rear differential before removal.



(A) Alignment mark

- 9) Remove the three bolts which hold propeller shaft to rear differential.
- 10) Remove the remaining bolt.
- 11) Remove the two bolts which hold center bearing to vehicle body.



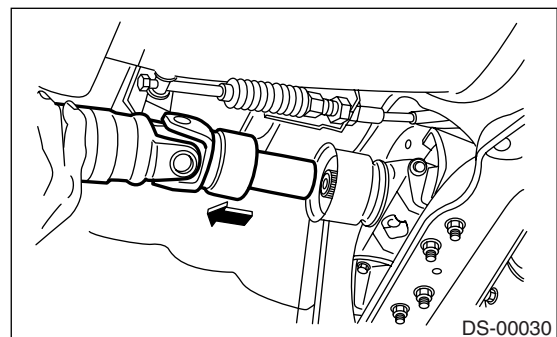
- 12) Remove the propeller shaft from transmission.

#### CAUTION:

- Be careful not to damage oil seals and frictional surface of sleeve yoke.
- Cover the center exhaust pipe with a cloth to keep off any ATF or oil spilled from transmission when removing propeller shaft.

#### NOTE:

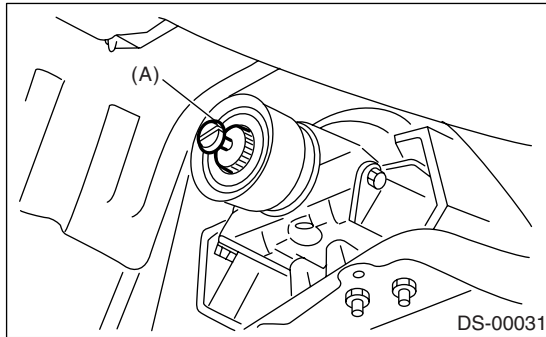
Use a container to catch ATF or oil flowing from propeller shaft.



- 13) Install the extension cap to transmission.

**NOTE:**

If extension cap is not available, place vinyl bag over opening and fasten with string to prevent gear oil or ATF from leaking.



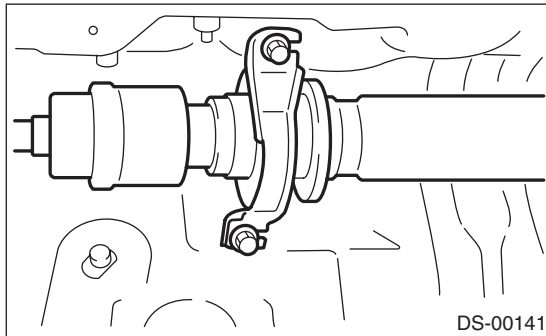
(A) Extension cap

## B: INSTALLATION

1) Insert the sleeve yoke into the transmission and attach center bearing to body.

**Tightening torque:**

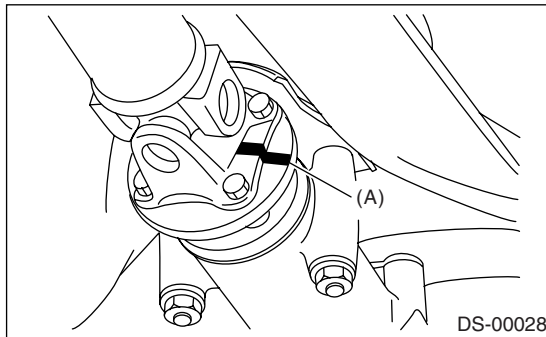
**52 N·m (5.3 kgf-m, 38.3 ft-lb)**



2) Align the matching marks and connect the flange yoke and rear differential.

**Tightening torque:**

**31 N·m (3.2 kgf-m, 23.1 ft-lb)**



(A) Alignment mark

- 3) Install the heat shield cover.
- 4) Install the center exhaust pipe.
- 5) Install the rear exhaust pipe and muffler.
- 6) Lower the vehicle.

7) Connect the battery ground cable to battery.

## C: INSPECTION

**NOTE:**

Do not disassemble propeller shaft. Check the following and replace if necessary.

- Tube surface for dents or cracks
- Splines for deformation or abnormal wear
- Joints for non-smooth operation or abnormal noise
- Center bearing for free play, noise or non-smooth operation.
- Oil seals for abnormal wear or damage
- Center bearing for breakage

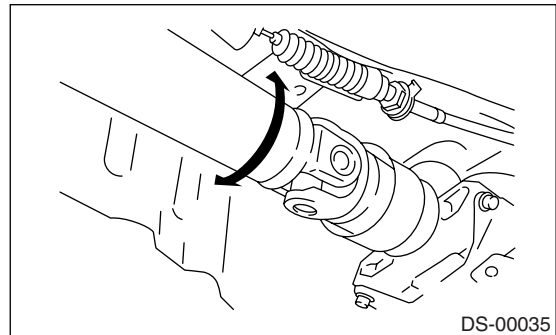
Check the following points with propeller shaft installed in vehicle.

### 1. JOINTS AND CONNECTIONS

- 1) Remove the center exhaust pipe.
- 2) Remove the heat shield cover.
- 3) Check for any looseness of the yoke flange mounting bolts which connect to rear differential and center bearing bracket mounting bolts.

### 2. SPLINES AND BEARING

- 1) Remove the center exhaust pipe.
- 2) Remove the rear exhaust pipe and muffler.
- 3) Remove the heat shield cover.
- 4) Turn the propeller shaft by hand to see if abnormal free play exists at splines. Also move yokes to see if abnormal free play exists at spiders and bearings.

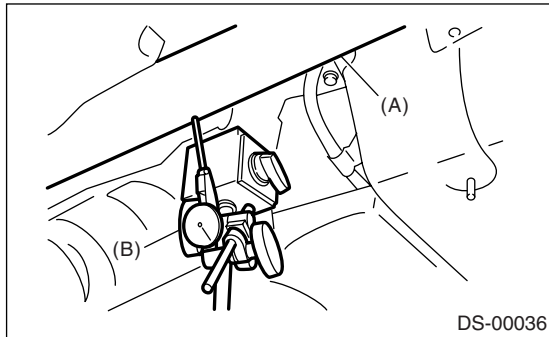


### 3. RUNOUT OF PROPELLER SHAFT

- 1) Remove the center exhaust pipe.
- 2) Remove the rear exhaust pipe and muffler.
- 3) Remove the heat shield cover.
- 4) Set the dial gauge with its indicator stem at center of propeller shaft tube.
- 5) Turn the propeller shaft slowly by hands to check for "runout" of propeller shaft.

### **Runout:**

**Service limit 0.6 mm (0.024 in)**

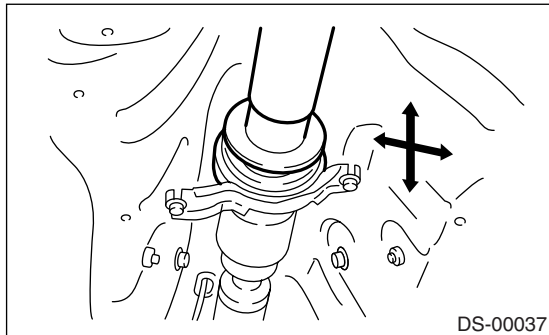


(A) Propeller shaft

(B) Dial gauge

### **4. CENTER BEARING FREE PLAY**

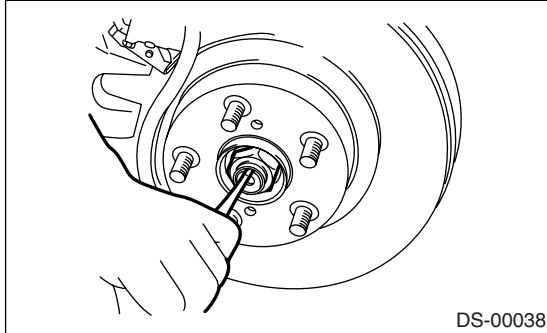
- 1) Remove the front and center exhaust pipe.
- 2) Remove the rear exhaust pipe and muffler.
- 3) Remove the heat shield cover.
- 4) Move the propeller shaft near center bearing up and down, and left and right with your hand to check for any abnormal bearing free play.



### 3. Front Axle

#### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Lift-up the vehicle and remove the front wheels.
- 3) Unlock the axle nut.

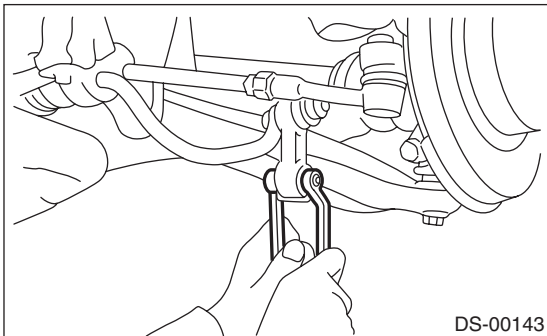


- 4) Remove the axle nut using a socket wrench while depressing the brake pedal.

#### CAUTION:

**Remove the wheel before loosening the axle nut. Failure to follow this rule may damage the wheel bearings.**

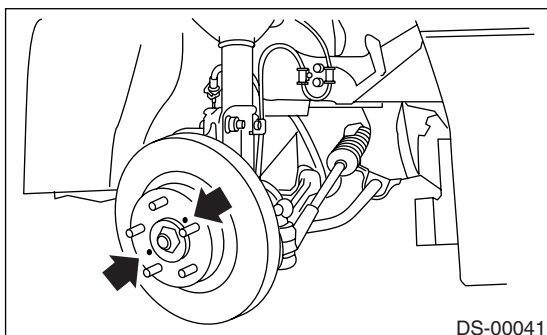
- 5) Remove the stabilizer link.



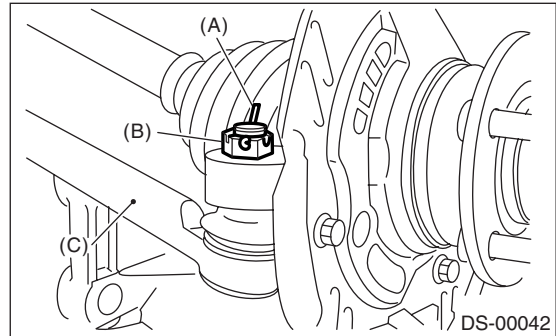
- 6) Remove the disc brake caliper from housing, and suspend it from strut using a wire.
- 7) Remove the disc rotor from hub.

#### NOTE:

If the disc rotor seizes up within hub, drive disc rotor out by installing an 8-mm bolt in screw hole on rotor.

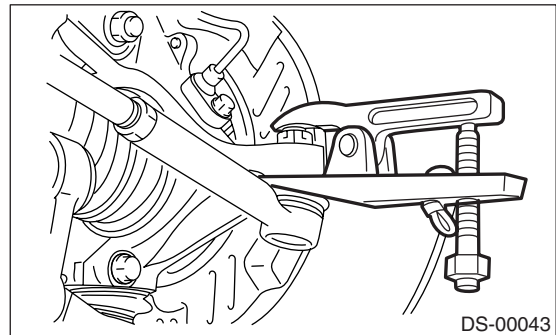


- 8) Remove the cotter pin and castle nut which secure tie-rod end to housing knuckle arm.



- (A) Cotter pin
- (B) Castle nut
- (C) Tie-rod

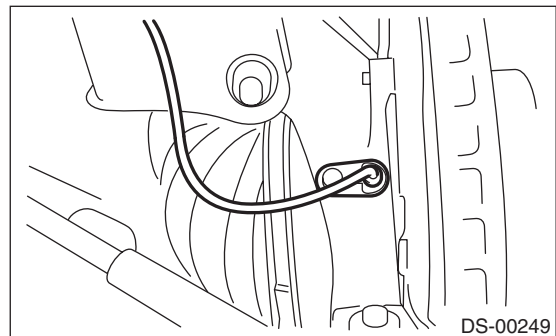
- 9) Using a puller, remove the tie-rod ball joint from knuckle arm.



#### CAUTION:

**When removing tie-rod, do not hit the tie-rod end with hammer.**

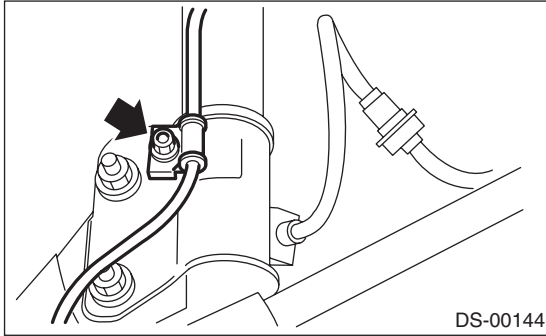
- 10) Remove the ABS wheel speed sensor assembly and harness.



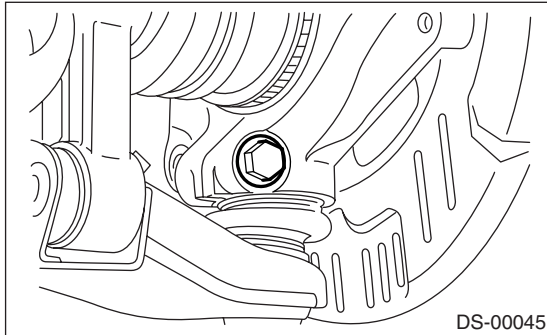
## Front Axle

### DRIVE SHAFT SYSTEM

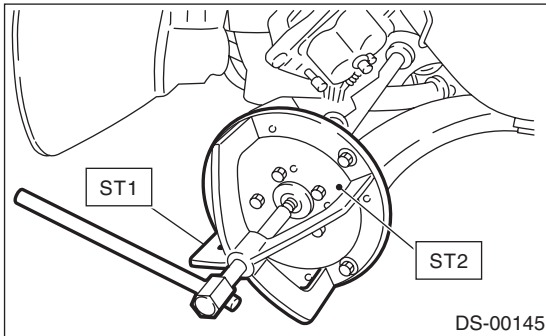
- 11) Remove the bolts which secure sensor harness to strut.



- 12) Remove the front arm ball joint from housing.

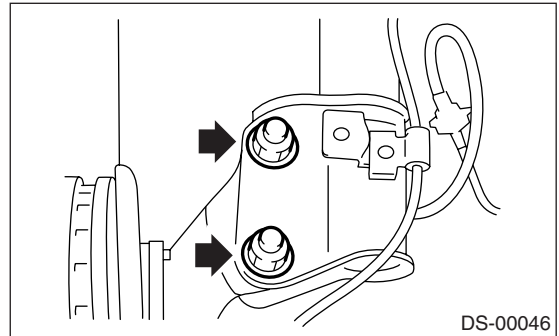


- 13) Remove the PTJ from transmission.  
14) Remove the front drive shaft assembly from hub. If it is hard to remove, use STs.  
ST1 926470000 AXLE SHAFT PULLER  
ST2 927140000 AXLE SHAFT PULLER PLATE



- 15) After scribing an alignment mark on camber adjusting bolt head, remove the bolts which connect

housing and strut, and disconnect the housing from strut.



## B: INSTALLATION

- 1) While aligning the alignment mark on the camber adjusting bolt head, tighten the housing and strut using a new self-locking nut.

### **Tightening torque:**

**152 N·m (15.5 kgf-m, 112 ft-lb)**

- 2) Install the front drive shaft. <Ref. to DS-22, INSTALLATION, Front Drive Shaft.>  
3) Install the front arm ball joint to housing.

### **Tightening torque:**

**50 N·m (5.1 kgf-m, 36.9 ft-lb)**

- 4) Install the ABS wheel speed sensor harness to strut.  
5) Install the ABS wheel speed sensor on housing.

### **Tightening torque:**

**7.5 N·m (0.76 kgf-m, 5.5 ft-lb)**

- 6) Install the disc rotor on hub.  
7) Install the disc brake caliper on housing.

### **Tightening torque:**

**80 N·m (8.2 kgf-m, 59 ft-lb)**

- 8) Install the stabilizer link.  
9) Connect the tie-rod end ball joint to the knuckle arm with a castle nut.

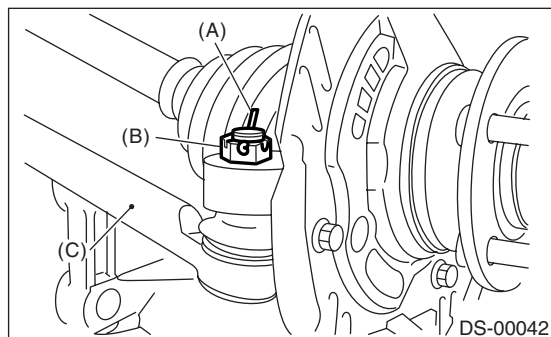
### **Tightening torque:**

**27.0 N·m (2.75 kgf-m, 19.9 ft-lb)**

## CAUTION:

**When connecting, do not hit the cap at bottom of tie-rod end with hammer.**

10) Tighten the castle nut to specified torque and tighten further within 60° until the pin hole is aligned with the slot in nut. Bend the cotter pin to lock.



- (A) Cotter pin
- (B) Castle nut
- (C) Tie-rod

11) While depressing the brake pedal, tighten a new axle nut (olive color) to specified torque and lock it securely.

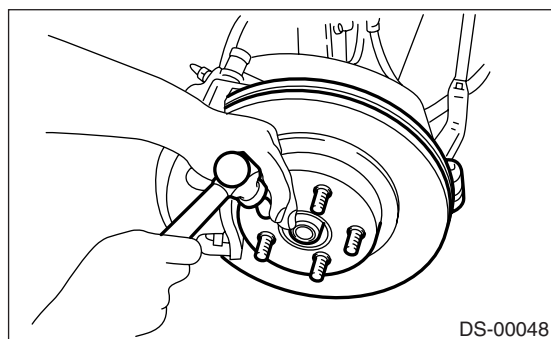
### Tightening torque:

**220 N·m (22.4 kgf·m, 162 ft·lb)**

### CAUTION:

- Install the wheel after installation of axle nut. Failure to follow this rule may damage the wheel bearing.
- Be sure to tighten the axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

12) After tightening the axle nut, lock it securely.



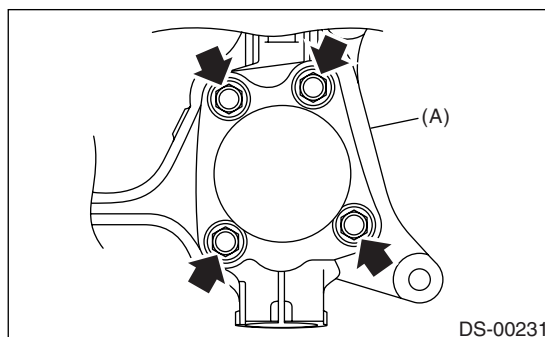
13) Install the wheel and tighten the wheel nuts to specified torque.

### Tightening torque:

**110 N·m (11.2 kgf·m, 81.1 ft·lb)**

## C: DISASSEMBLY

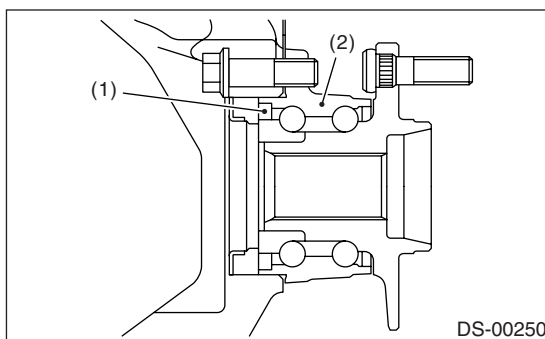
1) Remove the four bolts from housing, and remove the front hub unit bearing and disc cover.



- (A) Housing

### CAUTION:

- Do not get closer the tool which charged magnetism to magnetic encorder.
- Be careful not to damage the magnetic encoder.



- (1) Magnetic encoder
- (2) Front hub unit bearing

2) Disassemble the front hub unit bearing. <Ref. to DS-18, DISASSEMBLY, Front Hub Unit Bearing.>

## D: ASSEMBLY

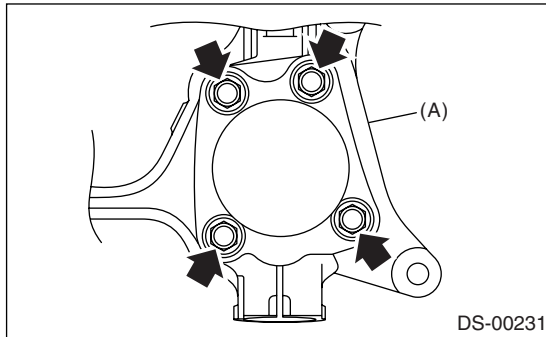
1) Assemble the front hub unit bearing. <Ref. to DS-18, ASSEMBLY, Front Hub Unit Bearing.>

2) Place the disc cover between housing and front hub unit, and tighten the four bolts.

## Front Axle

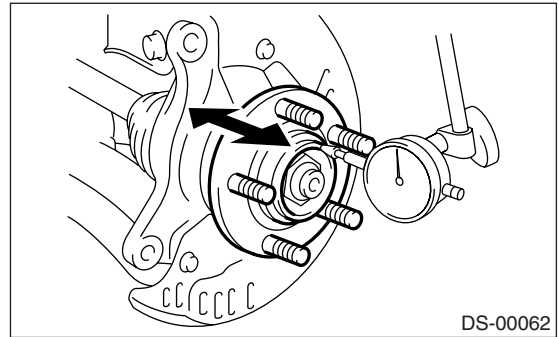
### DRIVE SHAFT SYSTEM

**Tightening torque:**  
**65 N·m (6.6 kgf-m, 47.9 ft-lb)**



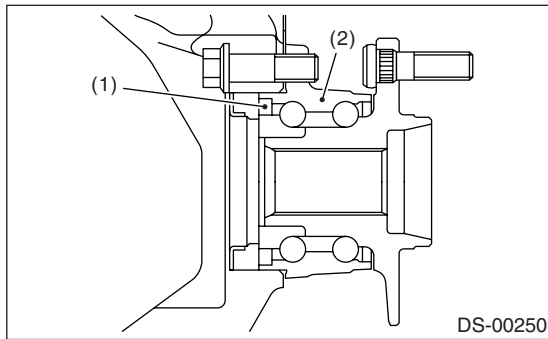
(A) Housing

**Service limit:**  
**Maximum: 0.05 mm (0.0020 in)**



### CAUTION:

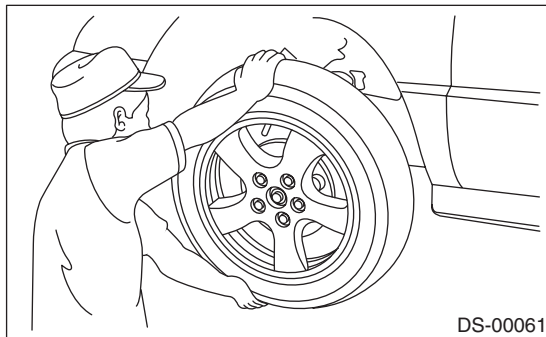
- Do not get closer the tool which charged magnetism to magnetic encorder.
- Be careful not to damage the magnetic encorder.



- (1) Magnetic encoder  
(2) Front hub unit bearing

## E: INSPECTION

1) Moving the front tire up and down by hand, check there is no backlash in bearing, and check the wheel rotates smoothly.

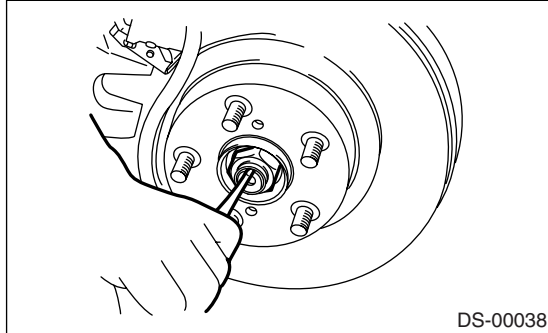


2) Inspect the lean of axis direction using a dial gauge. Replace the bearing if the load range exceeds the limitation.

## 4. Front Hub Unit Bearing

### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Lift-up the vehicle and remove the front wheels.
- 3) Unlock the axle nut.



- 4) Remove the axle nut using a socket wrench while depressing the brake pedal.

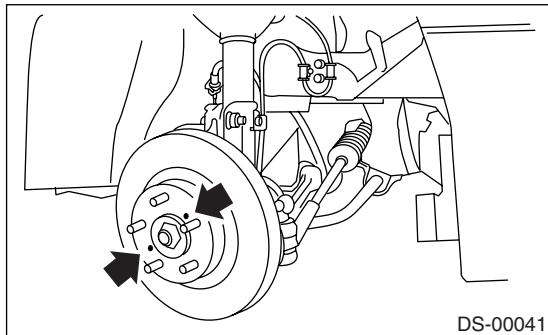
#### CAUTION:

**Remove the wheel before loosening the axle nut. Failure to follow this rule may damage the wheel bearings.**

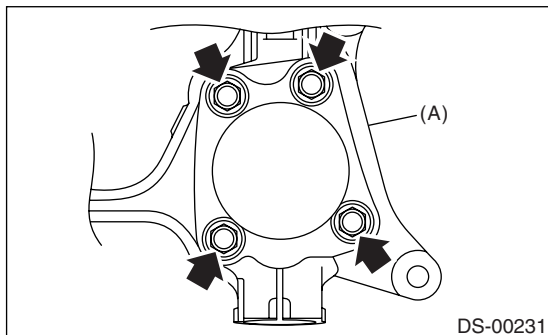
- 5) Remove the disc brake caliper from housing, and suspend it from strut using a wire.
- 6) Remove the disc rotor from hub.

#### NOTE:

If the disc rotor seizes up within hub, drive disc rotor out by installing an 8-mm bolt in screw hole on rotor.



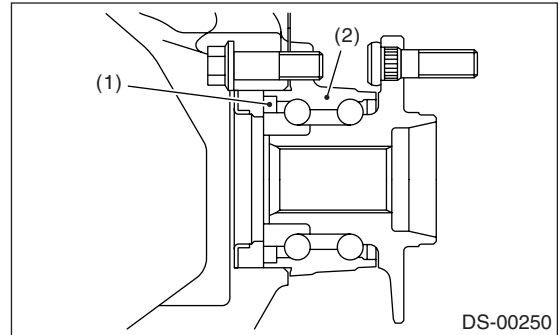
- 7) Remove four bolts from housing.



(A) Housing

#### CAUTION:

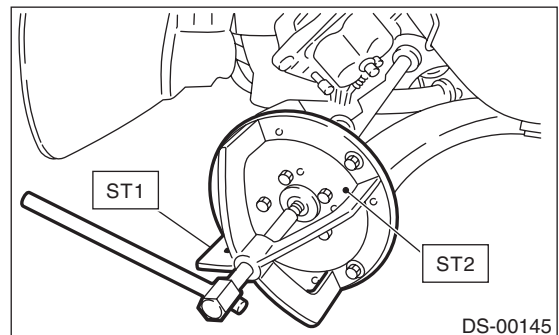
- Do not get closer the tool which charged magnetism to magnetic encorder.
- Be careful not to damage the magnetic en-coder.



- (1) Magnetic encoder
- (2) Front hub unit bearing

- 8) Remove the front hub unit bearing. If it is hard to remove, use STs.

ST1 926470000 AXLE SHAFT PULLER  
ST2 927140000 AXLE SHAFT PULLER  
PLATE

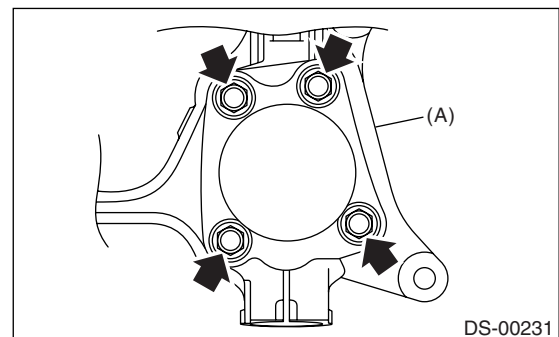


### B: INSTALLATION

- 1) Place the disc cover between housing and front hub unit, and tighten the four bolts.

#### Tightening torque:

**65 N·m (6.6 kgf-m, 47.9 ft-lb)**



(A) Housing

## Front Hub Unit Bearing

### DRIVE SHAFT SYSTEM

- 2) Install the front drive shaft. <Ref. to DS-22, INSTALLATION, Front Drive Shaft.>
- 3) Tighten the axle nut temporarily.
- 4) Install the disc rotor on hub.
- 5) Install the disc brake caliper on the housing.

#### **Tightening torque:**

**80 N·m (8.2 kgf-m, 59 ft-lb)**

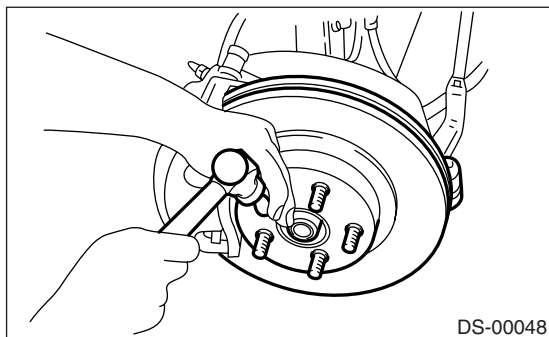
- 6) While depressing the brake pedal, tighten a new axle nut (olive color) to specified torque and lock it securely.

#### **Tightening torque:**

**220 N·m (22.4 kgf-m, 162 ft-lb)**

#### **CAUTION:**

- Install the wheel after installation of the axle nut. Failure to follow this rule may damage the wheel bearing.
  - Be sure to tighten the axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.
- 7) After tightening the axle nut, lock it securely.



- 8) Install the wheel and tighten the wheel nuts to specified torque.

#### **Tightening torque:**

**110 N·m (11.2 kgf-m, 81.1 ft-lb)**

### **C: DISASSEMBLY**

Using the ST and a hydraulic press, drive hub bolts out.

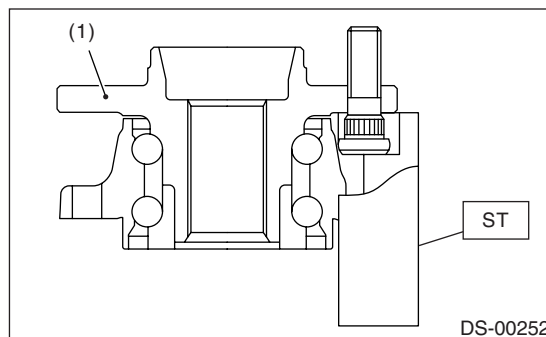
ST 28399AG000 HUB STAND

#### **CAUTION:**

- Be careful not to hammer the hub bolts. This may deform the hub.
- Do not reuse the hub bolt.

#### **NOTE:**

Since the hub unit bearing can not be disassembled, only hub bolts can be removed.

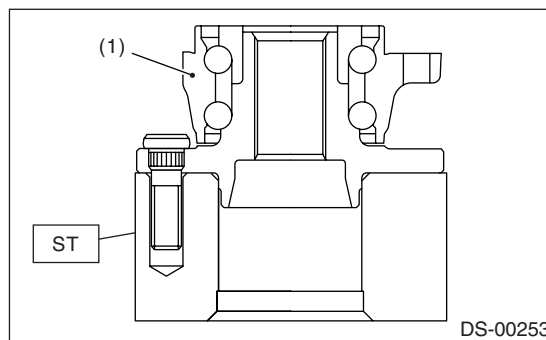


(1) Front hub unit bearing

### **D: ASSEMBLY**

- 1) Attach the hub to ST securely.

ST 927080000 HUB STAND



(1) Front hub unit bearing

- 2) Using a press, press new hub bolts until their seating surfaces contact the hub.

#### **NOTE:**

Use 12 mm (0.47 in) dia. holes in HUB STAND to prevent bolts from tilting.

### **E: INSPECTION**

Refer to "FRONT AXLE" for inspection procedures. <Ref. to DS-16, INSPECTION, Front Axle.>

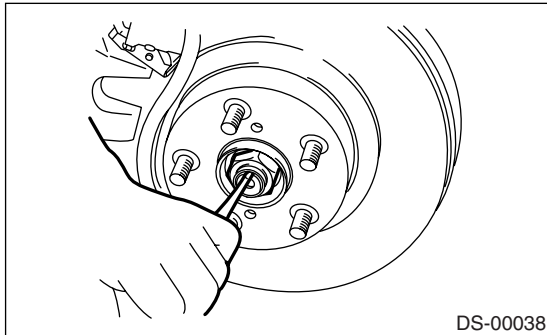
#### **CAUTION:**

If there is any fault in the bearing, replace hub unit bearing.

## 5. Rear Hub Unit Bearing

### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Lift-up the vehicle, and then remove the rear wheels.
- 3) Unlock the axle nut.

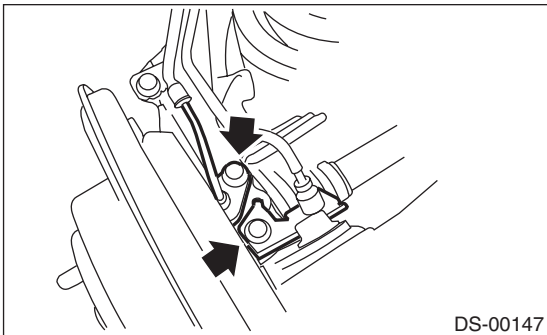


- 4) While applying the parking brake, remove the axle nut using the socket wrench.

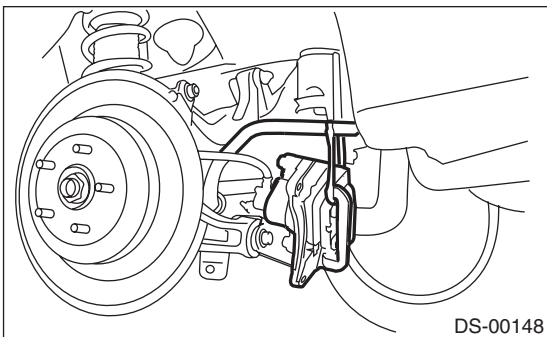
#### CAUTION:

**Remove the wheel before loosening the axle nut. Failure to follow this rule may damage the wheel bearings.**

- 5) Release the parking brake.
- 6) Remove the rear ABS wheel speed sensor.



- 7) Remove the disc brake caliper from back plate, and suspend it from stabilizer using wire.



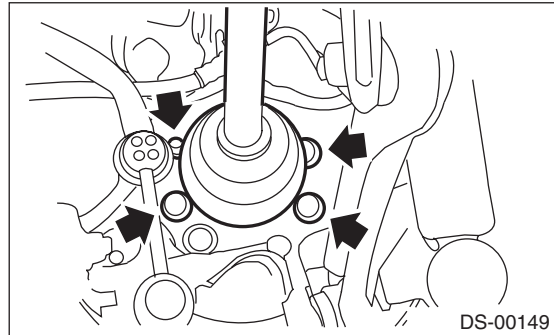
- 8) Remove the disc rotor from hub.

#### NOTE:

- Mark the mating surface of hub and disc rotor before removing the disc rotor to avoid confusing when installing.

- If the disc rotor seizes up within hub, drive the disc rotor out by installing an 8-mm bolt in screw hole on rotor.

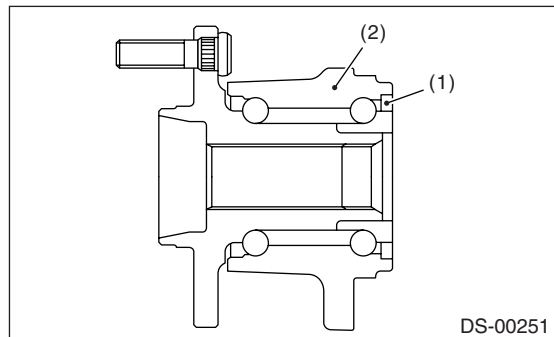
- 9) Remove the four bolts from rear arm.



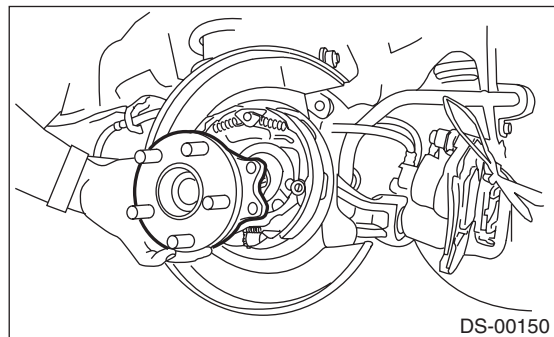
- 10) Remove the hub unit bearing.

#### CAUTION:

- **Be careful not to damage the magnetic encoder.**
- **Do not get closer the tool which charged magnetism to magnetic encoder.**



- (1) Magnetic encoder
- (2) Rear hub unit bearing



#### NOTE:

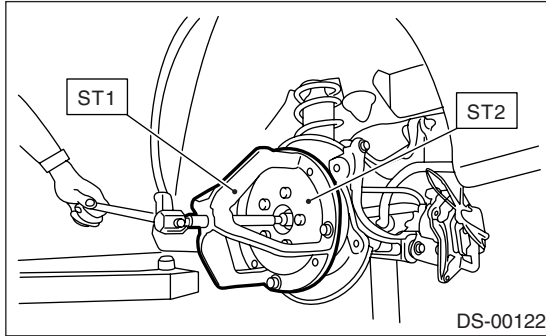
If it is hard to remove, use STs.

ST1 926470000 AXLE SHAFT PULLER

## Rear Hub Unit Bearing

### DRIVE SHAFT SYSTEM

ST2 927140000 AXLE SHAFT PULLER  
PLATE

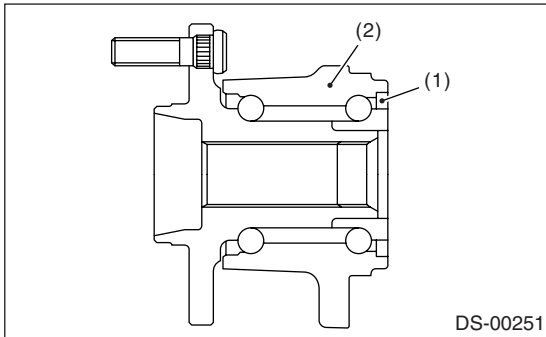


### B: INSTALLATION

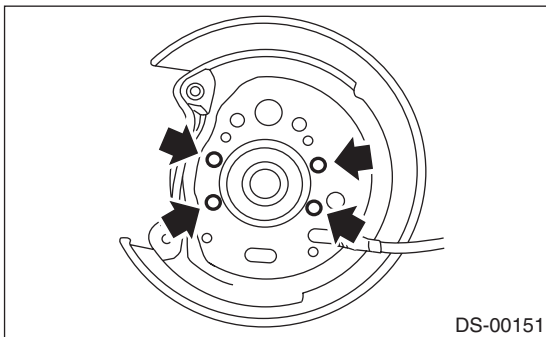
1) Aligning the hub unit bearing to the mounting hole of the back plate, install the hub unit assembly and back plate. Tighten the axle nut temporarily.

#### CAUTION:

- Be careful not to damage the magnetic encoder.
- Do not get closer the tool which charged magnetism to magnetic encoder.

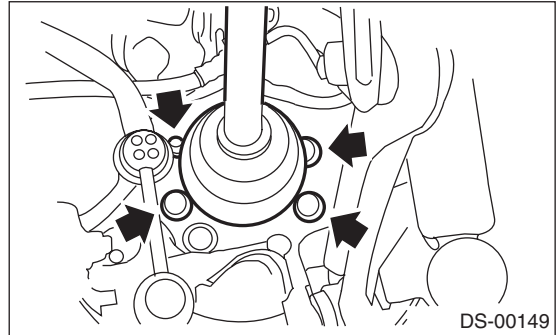


- (1) Magnetic encoder  
(2) Rear hub unit bearing



2) Tighten the four bolts to the back plate.

**Tightening torque:**  
**65 N·m (6.6 kgf-m, 47.9 ft-lb)**



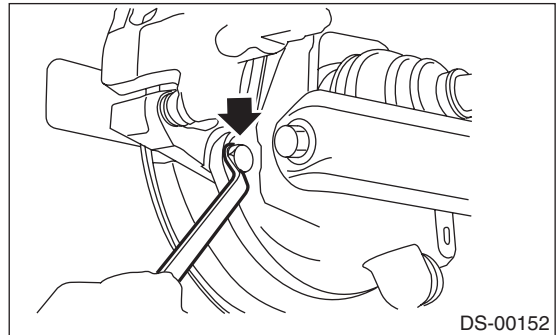
- 3) Remove the axle nut.  
4) Draw the rear drive shaft into specified position.  
5) Tighten the new axle nut temporarily.

#### CAUTION:

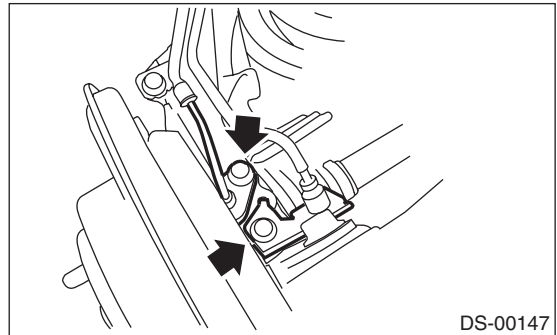
**Use a new axle nut (olive color).**

- 6) Install the disc rotor on hub.  
7) Install the disc brake caliper on back plate.

**Tightening torque:**  
**53 N·m (5.4 kgf-m, 39.1 ft-lb)**



8) Install the rear ABS wheel speed sensor and brake cable bracket.



9) Adjust the parking brake lever stroke by turning adjuster. <Ref. to PB-4, ADJUSTMENT, Parking Brake Lever.>

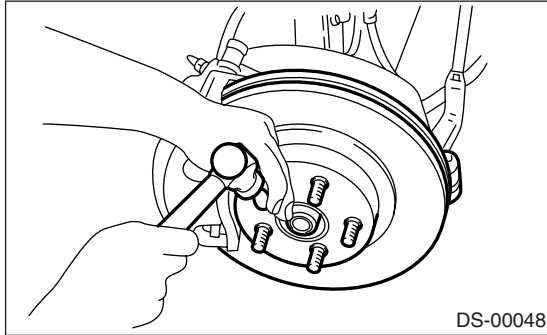
10) While applying the parking brake and depressing the brake pedal, tighten a new axle nut (olive color) to the specified torque and lock it securely.

**Tightening torque:**  
**240 N·m (24.5 kgf-m, 177 ft-lb)**

## CAUTION:

- Install the wheel after installation of the axle nut. Failure to follow this rule may damage the wheel bearing.
- Be sure to tighten the axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

11) After tightening the axle nut, lock it securely.



12) Install the wheel and tighten the wheel nuts to specified torque.

## Tightening torque:

**110 N·m (11.2 kgf·m, 81.1 ft·lb)**

## C: DISASSEMBLY

Using the ST and a hydraulic press, drive hub bolts out.

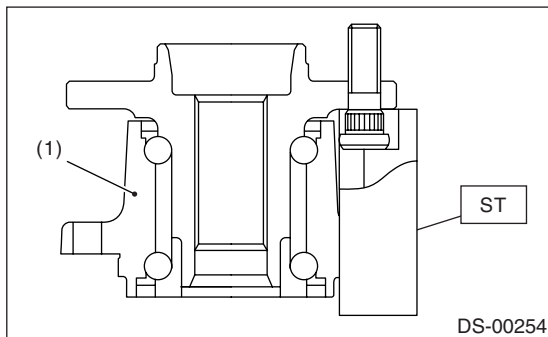
ST 28399AG000 HUB STAND

## CAUTION:

- Be careful not to hammer the hub bolts. This may deform the hub.
- Do not reuse the hub bolt.

## NOTE:

Since the hub unit bearing can not be disassembled, only hub bolts can be removed.

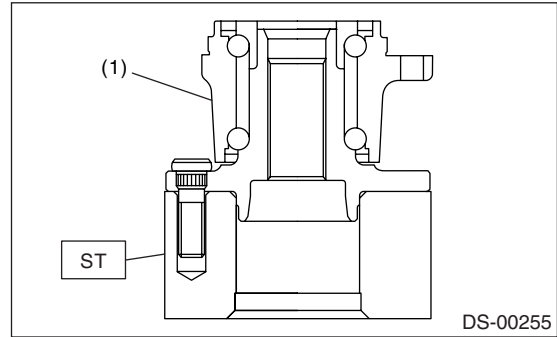


(1) Rear hub unit bearing

## D: ASSEMBLY

1) Attach the hub to ST securely.

ST 927080000 HUB STAND



(1) Rear hub unit bearing

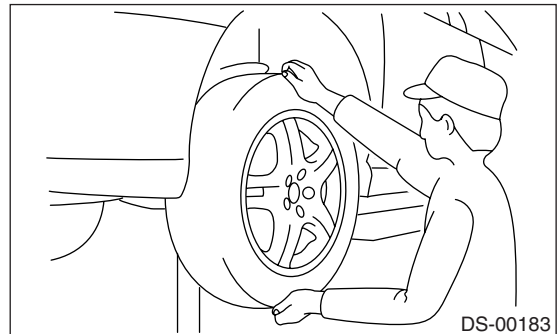
2) Using a press, press the new hub bolts until their seating surfaces contact the hub.

## NOTE:

Use 12 mm (0.47 in) dia. holes in HUB STAND to prevent bolts from tilting.

## E: INSPECTION

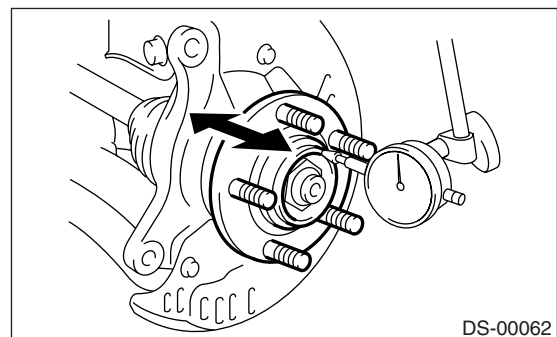
1) Moving the rear tire up and down by hand, check there is no backlash in bearing, and check the wheel rotates smoothly.



2) Inspect the lean of axis direction using a dial gauge. Replace the hub bearing if the lean range exceed the limitation.

## Service limit:

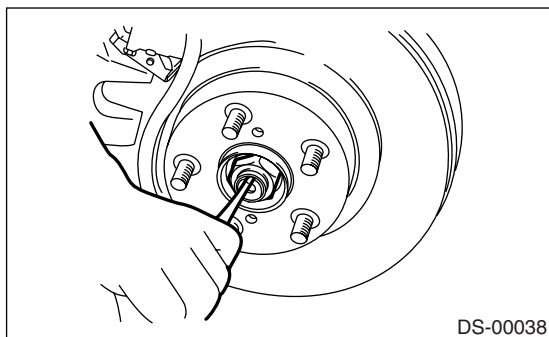
**Maximum: 0.05 mm (0.0020 in)**



### 6. Front Drive Shaft

#### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Lift-up the vehicle and remove the front wheels.
- 3) Drain the transmission gear oil. (MT model)
- 4) Drain the differential gear oil. (AT model)
- 5) Unlock the axle nut.

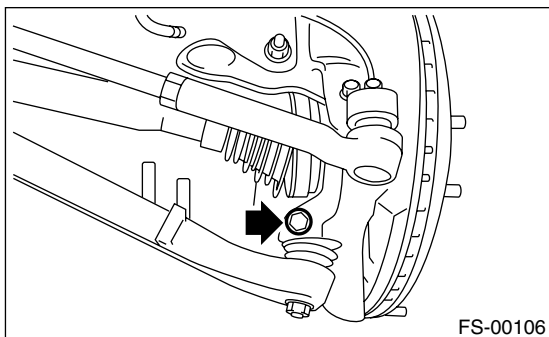


- 6) Remove the axle nut using a socket wrench while depressing the brake pedal.

#### CAUTION:

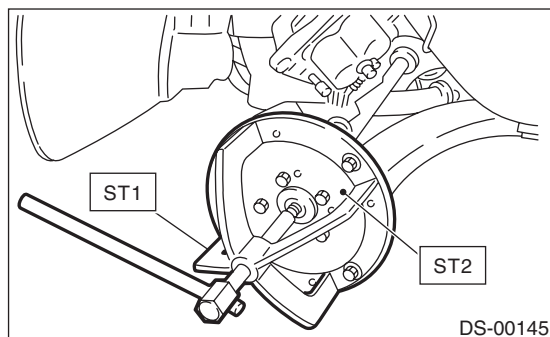
**Remove the wheel before loosening the axle nut. Failure to follow this rule may damage the wheel bearings.**

- 7) Remove the stabilizer link from front arm.
- 8) Disconnect the front arm ball joint from housing.



- 9) Remove the front drive shaft assembly. If it is hard to remove, use ST1 and ST2.

ST1 926470000 AXLE SHAFT PULLER  
ST2 927140000 AXLE SHAFT PULLER PLATE



- 10) Using a bar, remove the front drive shaft from transmission.

#### CAUTION:

**Be careful not to allow the bar to damage holder area.**

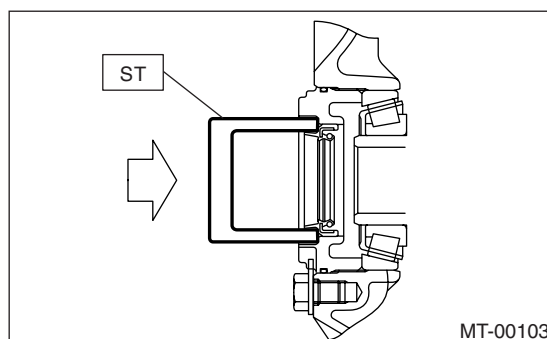
#### B: INSTALLATION

- 1) Using the ST, replace the differential side retainer oil seal with a new one.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

#### NOTE:

After pulling out the drive shaft, be sure to replace with a new oil seal.



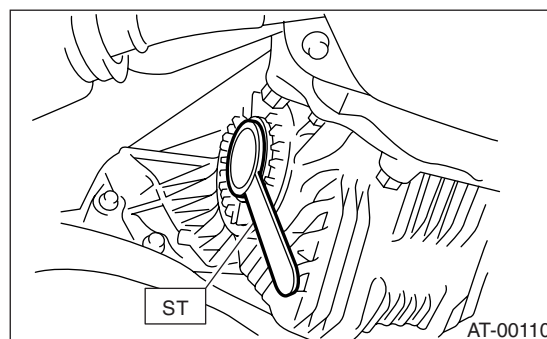
- 2) Insert the EBJ into hub splines.
- 3) Draw the drive shaft into specified position.

#### CAUTION:

**Do not hammer drive shaft when installing it.**

- 4) Tighten the axle nut temporarily.
- 5) Using the ST, install the front drive shaft to transmission.

ST 28399SA010 OIL SEAL PROTECTOR



- 6) Connect the front arm ball joint to housing.

#### Tightening torque:

**50 N·m (5.1 kgf-m, 36.9 ft-lb)**

- 7) Install the stabilizer link.

#### Tightening torque:

**45 N·m (4.6 kgf-m, 33.2 ft-lb)**

#### CAUTION:

**Be sure to use a new self-locking nut.**

8) While depressing the brake pedal, tighten a new axle nut (olive color) to the specified torque and lock it securely.

**Tightening torque:**

**220 N·m (22.4 kgf-m, 162 ft-lb)**

**CAUTION:**

- Install the wheel after installation of the axle nut. Failure to follow this rule may damage the wheel bearing.
- Be sure to tighten axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

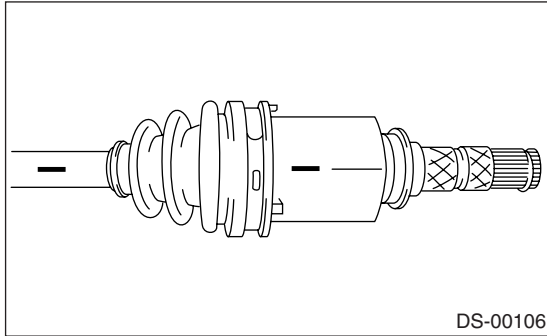
9) After tightening axle nut, lock it securely.

10) Add transmission gear oil. (MT model)

11) Add differential gear oil. (AT model)

### C: DISASSEMBLY

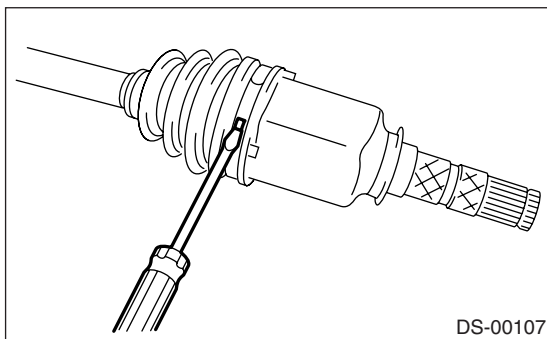
1) Place alignment marks on the shaft and outer race.



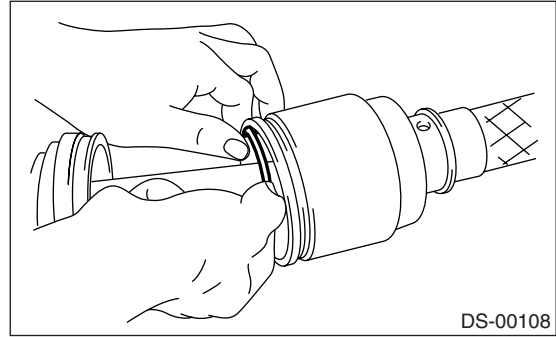
2) Remove the PTJ boot band and boot.

**CAUTION:**

**Be careful not to damage boot.**



3) Remove the snap ring from PTJ outer race.



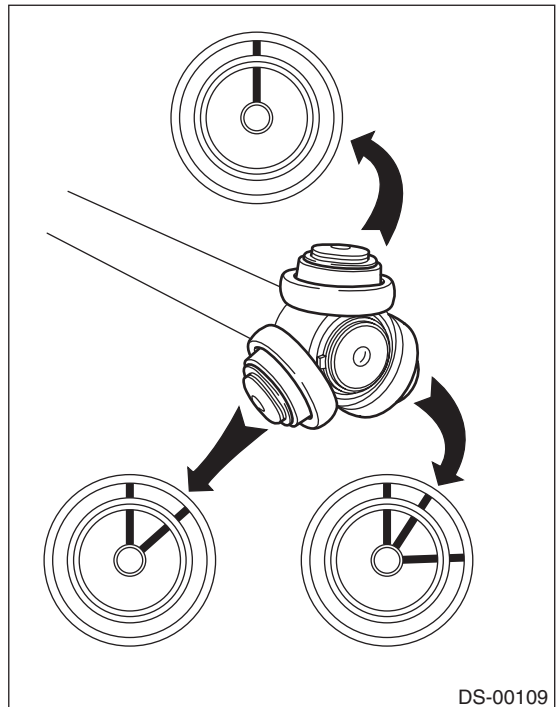
4) Remove the PTJ outer race from shaft assembly.

5) Wipe off grease.

**CAUTION:**

**The grease is a special grease. Do not confuse with other greases.**

6) Place alignment marks on the roller kit and trunnion.



7) Remove the roller kit from trunnion.

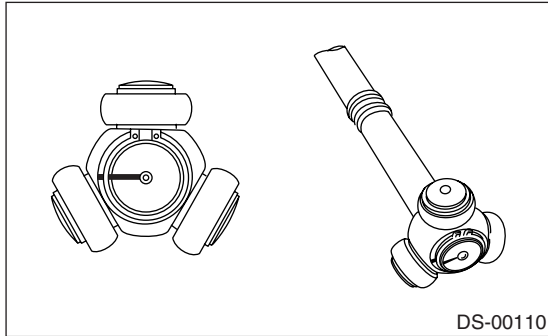
**CAUTION:**

**Be careful with the roller kit position.**

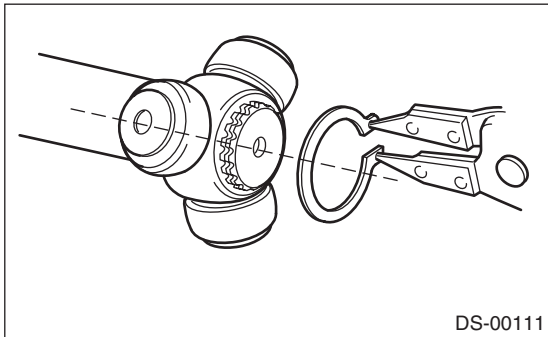
## Front Drive Shaft

### DRIVE SHAFT SYSTEM

- 8) Place alignment marks on the trunnion and shaft.



- 9) Remove the snap ring and trunnion.



**CAUTION:**  
Be sure to wrap shaft splines with vinyl tape to prevent boot from scratches.

- 10) Remove the PTJ boot.

**NOTE:**  
Further disassembly of axle is impossible because the BJ cannot be disassembled.

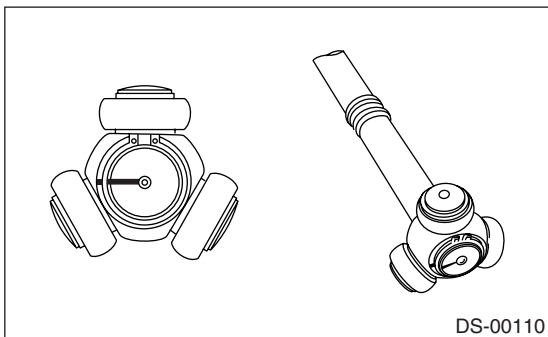
### D: ASSEMBLY

**NOTE:**  
Use specified grease.

#### PTJ side:

##### **NKG302 (Part No. 28395AG02A)**

- 1) Place the PTJ boot at the center of shaft.
- 2) Align alignment marks and install the trunnion on the shaft.

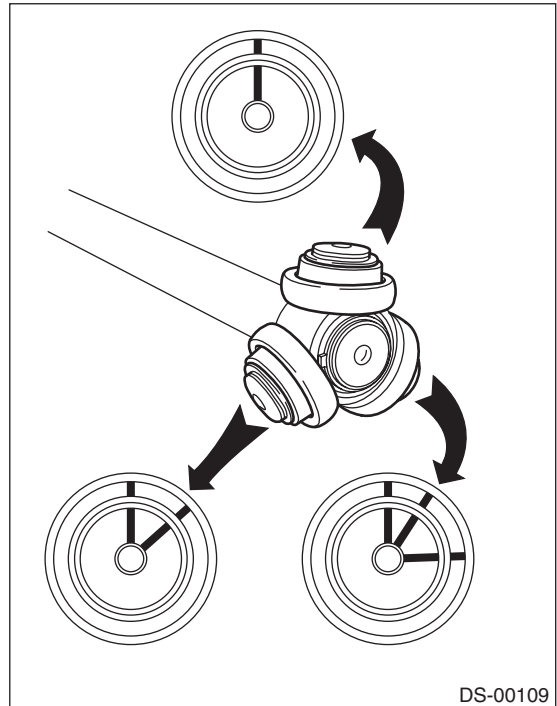


- 3) Install the snap ring to shaft.

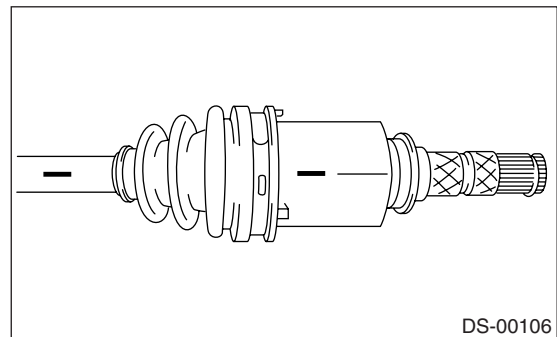
**CAUTION:**  
Confirm that the snap ring is completely fitted in shaft groove.

- 4) Fill 100 to 110 g (3.53 to 3.88 oz.) of specified grease into the interior of PTJ outer race.
- 5) Apply a thin coat of specified grease to the roller kit and trunnion.
- 6) Align alignment marks on roller kit and trunnion and install the roller kit.

**CAUTION:**  
Be careful with the roller kit position.



- 7) Align alignment marks on the shaft and outer race, and install outer race.



- 8) Install the snap ring in the groove on PTJ outer race.

**CAUTION:**  
Pull the shaft lightly and assure that the snap ring is completely fitted in the groove.

- 9) Apply an even coat of the specified grease 30 to 40 g (1.06 to 1.41 oz.) to the entire inner surface of boot.

10) Install the PTJ boot taking care not to twist it.

**CAUTION:**

- The large end of PTJ boot and the boot groove shall be cleaned completely so as to be free from grease and other substances.
- When installing PTJ boot, position outer race of PTJ at center of its travel.

11) Put a new band through the clip and wind twice in alignment with band groove of boot.

12) Pinch the end of band with pliers. Hold the clip and tighten securely.

**NOTE:**

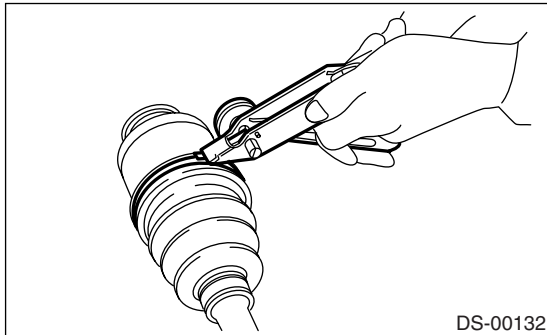
When tightening boot, use care so that the air within the boot is appropriate.

13) Tighten the band using ST.

ST 925091000 BAND TIGHTENING TOOL

**NOTE:**

Tighten the band until it cannot be moved by hand.

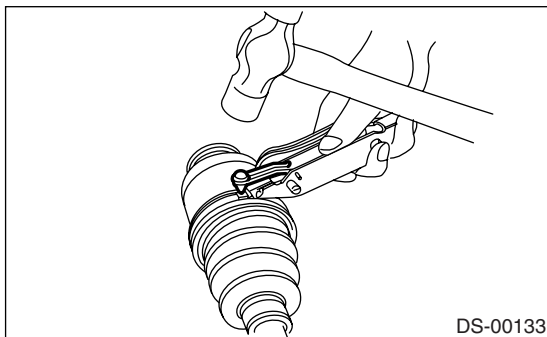


14) Tap on the clip with the punch provided at the end of ST.

ST 925091000 BAND TIGHTENING TOOL

**CAUTION:**

Tap to an extent that the boot underneath is not damaged.



15) Cut off the band with an allowance of about 10 mm (0.39 in) left from the clip and bend this allowance over the clip.

**CAUTION:**

Be careful so that the end of the band is in close contact with clip.

16) Extend and retract the PTJ to provide equal grease coating.

### E: INSPECTION

Check the removed parts for damage, wear, corrosion etc. If faulty, repair or replace.

- PTJ (pillow tripod joint)

Check for seizure, corrosion, damage, wear and excessive play.

- EBJ (high-efficiency compact ball fixed joint)

Check for seizure, corrosion, damage and excessive play.

- Shaft

Check for excessive bending, twisting, damage and wear.

- Boot

Check for wear, warping, breakage and scratches.

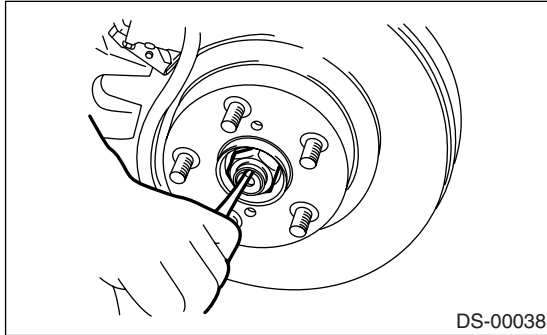
- Grease

Check for discoloration and fluidity.

### 7. Rear Drive Shaft

#### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Lift-up the vehicle, and then remove the rear wheels.
- 3) Unlock the axle nut.



- 4) While applying the parking brake, remove the axle nut using the socket wrench.

#### CAUTION:

**Remove the wheel before loosening the axle nut. Failure to follow this rule may damage the wheel bearings.**

- 5) Remove the rear differential assembly.

- T-type

<Ref. to DI-28, REMOVAL, Rear Differential (T-type).>

- VA-type

<Ref. to DI-44, REMOVAL, Rear Differential (VA-type).>

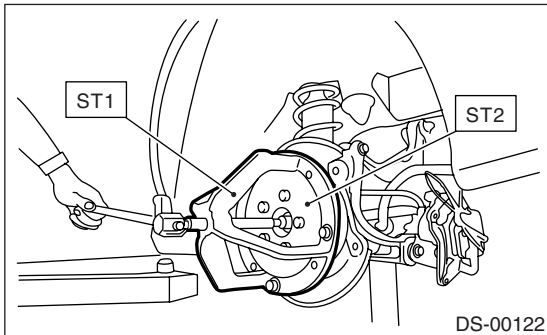
- 6) Remove the axle nut and rear drive shaft. If it is hard to remove, use ST1 and ST2.

ST1 926470000 AXLE SHAFT PULLER

ST2 927140000 AXLE SHAFT PULLER  
PLATE

#### CAUTION:

- Do not hammer drive shaft when removing.
- Do not damage the oil seal and magnetic encoder.

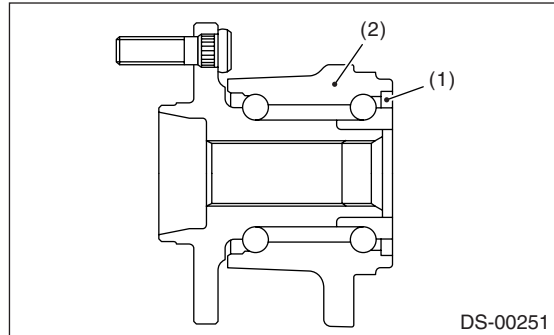


#### B: INSTALLATION

- 1) Insert the BJ or EBJ into rear hub splines.

#### CAUTION:

- Be careful not to damage the magnetic encoder.
- Do not get closer the tool which charged magnetism to magnetic encoder.



(1) Magnetic encoder

(2) Rear hub unit bearing

- 2) Draw the rear drive shaft into specified position.

#### CAUTION:

**Do not hammer drive shaft when installing it.**

- 3) Tighten the axle nut temporarily.

- 4) Install the rear differential assembly.

- T-type

<Ref. to DI-29, INSTALLATION, Rear Differential (T-type).>

- VA-type

<Ref. to DI-45, INSTALLATION, Rear Differential (VA-type).>

- 5) While applying the parking brake and depressing the brake pedal, tighten a new axle nut (olive color) to specified torque and lock it securely.

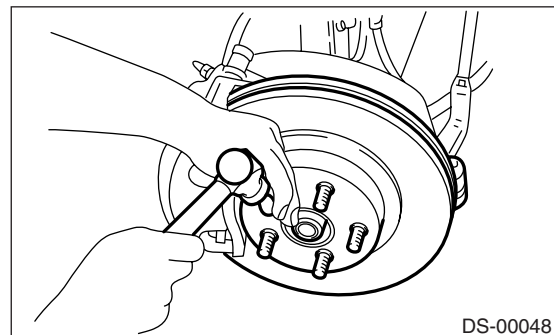
#### Tightening torque:

**240 N·m (24.5 kgf-m, 177 ft-lb)**

#### CAUTION:

- Install the wheel after installation of the axle nut. Failure to follow this rule may damage the wheel bearing.
- Be sure to tighten the axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

- 6) Lock the axle nut securely.



7) Install the wheel.

### **Tightening torque:**

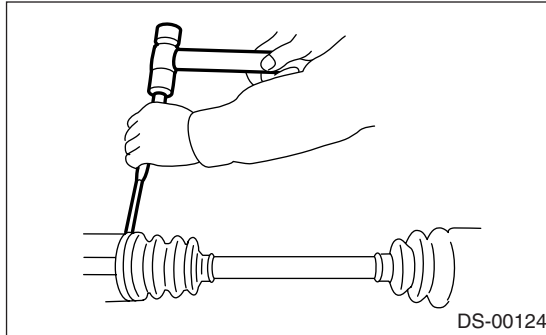
**110 N·m (11.2 kgf-m, 81.1 ft-lb)**

## **C: DISASSEMBLY**

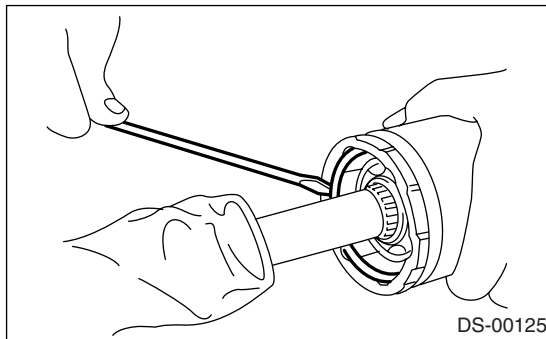
- 1) Straighten the bent claw of larger end of DOJ boot.
- 2) Loosen the band by means of screwdriver or pliers.

### **CAUTION:**

**Be careful not to damage boot.**



- 3) Remove the boot band on the small end of DOJ boot in the same manner.
- 4) Remove the larger end of DOJ boot from DOJ outer race.
- 5) Pry and remove the round circlip located at the neck of DOJ outer race with a screwdriver.



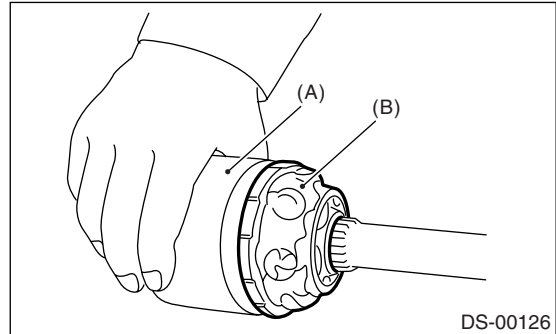
- 6) Take out the DOJ outer race from shaft assembly.
- 7) Wipe off the grease and take out balls.

### **CAUTION:**

**The grease is a special grease (grease for constant velocity joint). Do not confuse with other greases.**

### **NOTE:**

Disassemble exercising care not to lose balls (6 pcs).



- (A) Outer race
- (B) Grease

- 8) To remove the cage from inner race, turn the cage by a half pitch to the track groove of inner race and shift the cage.
- 9) Remove the snap ring, which fixes inner race to shaft, using pliers.
- 10) Take out the DOJ inner race.
- 11) Take off the DOJ cage from shaft and remove DOJ boot.

### **CAUTION:**

**Be sure to wrap shaft splines with vinyl tape to prevent boot from scratches.**

- 12) Remove the BJ boot or EBJ boot in the same procedure as DOJ boot.

### **NOTE:**

Further disassembly of axle is impossible because the BJ and EBJ cannot be disassembled.

## **D: ASSEMBLY**

### **NOTE:**

Use specified grease.

### **BJ side:**

**NTG2218-M (Part No. 28395AG01A)**

### **EBJ side:**

**NTG2218-M (Part No. 28395AG01A)**

### **DOJ side:**

**NKG205 (Part No. 28495AG00A)**

- 1) Install the BJ or EBJ boot in specified position, and fill it with 60 to 70 g (2.12 to 2.47 oz.) of specified grease.
- 2) Place the DOJ boot at the center of shaft.

### **CAUTION:**

**Be sure to wrap shaft splines with vinyl tape to prevent boot from scratches.**

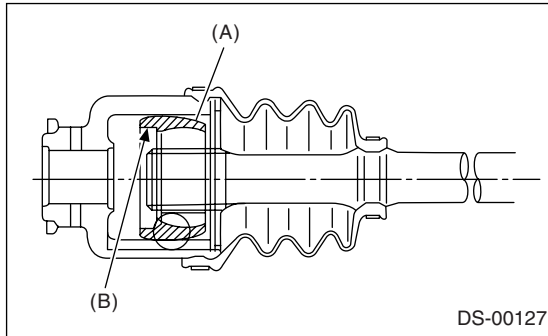
- 3) Insert the DOJ cage onto shaft.

## Rear Drive Shaft

### DRIVE SHAFT SYSTEM

#### NOTE:

Insert the cage with the cut-out portion facing the shaft end, since the cage has an orientation.

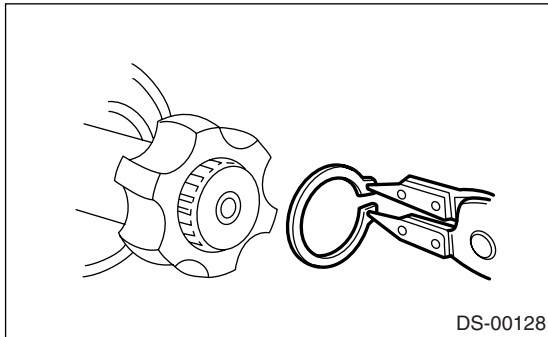


- (A) Cage  
(B) Cutout

4) Install the DOJ inner race on shaft and fit the snap ring with pliers.

#### NOTE:

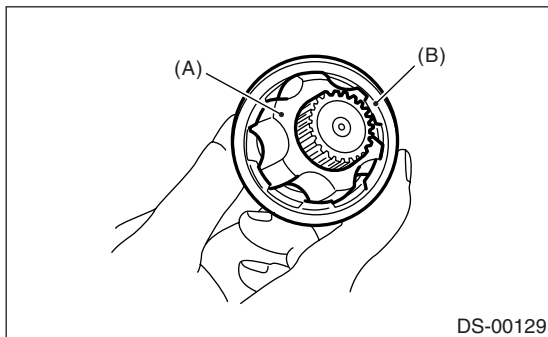
Confirm that the snap ring is completely fitted in the shaft groove.



5) Install the cage to inner race fixed upon shaft.

#### NOTE:

Fit the cage with the protruded part aligned with the track on the inner race and then turn by a half pitch.



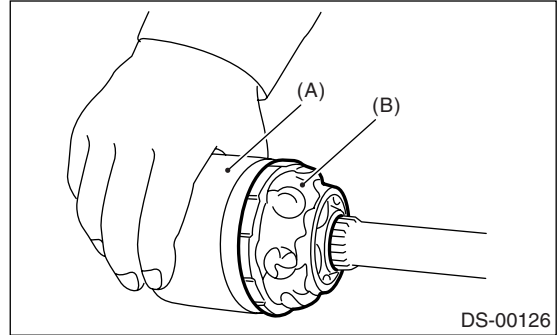
- (A) Inner race  
(B) Cage

6) Fill 80 to 90 g (2.82 to 3.17 oz.) of specified grease into the interior of DOJ outer race.

7) Apply a coat of specified grease to the cage pocket and six balls.

8) Insert six balls into the cage pocket.

9) Align the outer race track and ball positions, and place the shaft, inner race, cage and balls in the original positions and then fit outer race.

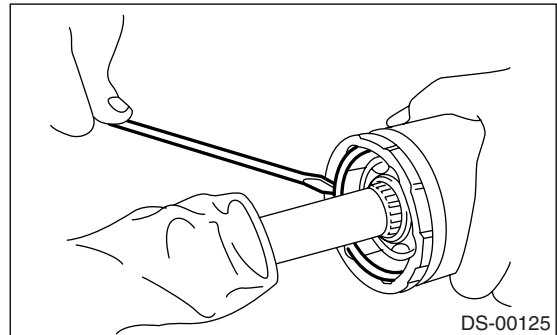


- (A) Outer race  
(B) Grease

10) Install the snap ring in the groove on DOJ outer race.

#### NOTE:

- Assure that the balls, cage and inner race are completely fitted in the outer race of DOJ.
- Use care not to place the matched position of snap ring in the ball groove of outer race.
- Pull the shaft lightly and assure that the circlip is completely fitted in the groove.



11) Apply an even coat of the specified grease [20 to 30 g (0.71 to 1.06 oz.)] to the entire inner surface of boot. Also apply grease to shaft.

12) Install the DOJ boot taking care not to twist it.

#### NOTE:

- The inside of the larger end of DOJ boot and the boot groove shall be cleaned so as to be free from grease and other substances.
- When installing DOJ boot, position outer race of DOJ at center of its travel.

13) Put a new band through the clip and wind twice in alignment with band groove of boot.

14) Pinch the end of band with pliers. Hold the clip and tighten securely.

**NOTE:**

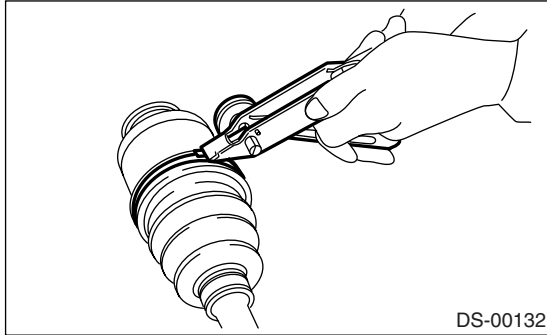
When tightening boot, exercise care so that the air within the boot is appropriate.

15) Tighten the band by using ST.

ST 925091000 BAND TIGHTENING TOOL

**NOTE:**

Tighten the band until it cannot be moved by hand.

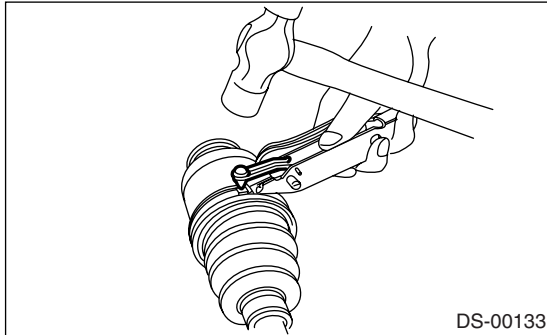


16) Tap on the clip with the punch provided at the end of ST.

ST 925091000 BAND TIGHTENING TOOL

**NOTE:**

Tap to an extent that the boot underneath is not damaged.



17) Cut off the band with an allowance of about 10 mm (0.39 in) left from the clip and bend this allowance over the clip.

**NOTE:**

Be careful so that the end of the band is in close contact with clip.

18) Install the BJ boot or EBJ boot in the same procedure as DOJ boot.

19) Extend and retract the DOJ to provide equal grease coating.

### E: INSPECTION

Check the removed parts for damage, wear, corrosion etc. Repair or replace if defective.

- DOJ (Double Offset Joint)

Check for seizure, corrosion, damage, wear and excessive play.

- EBJ (high-efficiency compact ball fixed joint)

Check for seizure, corrosion, damage, wear and excessive play.

- Shaft

Check for excessive bending, twisting, damage and wear.

- BJ (Bell Joint)

Check for seizure, corrosion, damage and excessive play.

- Boot

Check for wear, warping, breakage and scratches.

- Grease

Check for discoloration and fluidity.

# General Diagnostic Table

## DRIVE SHAFT SYSTEM

### 8. General Diagnostic Table

#### A: INSPECTION

##### NOTE:

Vibration while cruising may be caused by an unbalanced tire, improper tire inflation pressure, improper wheel alignment, etc.

| Symptom                                        | Possible cause                   | Corrective action                                                                                                |
|------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Noise or vibration from propeller shaft</b> | Center bearing                   | Check the center bearing. <Ref. to DS-12, CENTER BEARING FREE PLAY, INSPECTION, Propeller Shaft.>                |
|                                                | Runout of propeller shaft        | Check the vibration of propeller shaft. <Ref. to DS-11, RUNOUT OF PROPELLER SHAFT, INSPECTION, Propeller Shaft.> |
|                                                | Loose or free play of connection | Check joint and connector. <Ref. to DS-11, JOINTS AND CONNECTIONS, INSPECTION, Propeller Shaft.>                 |
|                                                |                                  | Check splines and bearing. <Ref. to DS-11, SPLINES AND BEARING, INSPECTION, Propeller Shaft.>                    |
| <b>Abnormal wheel vibration</b>                | Wheel is out of balance.         | Check the wheel balance. <Ref. to WT-8, ADJUSTMENT, Wheel Balancing.>                                            |
|                                                | Front wheel alignment            | Check the front wheel alignment. <Ref. to FS-7, INSPECTION, Wheel Alignment.>                                    |
|                                                | Rear wheel alignment             | Check the rear wheel alignment. <Ref. to RS-8, INSPECTION, Wheel Alignment.>                                     |
|                                                | Front strut                      | Check the front strut. <Ref. to FS-23, INSPECTION, Front Strut.>                                                 |
|                                                | Rear shock absorber              | Check the rear shock absorber. <Ref. to RS-16, INSPECTION, Rear Shock Absorber.>                                 |
|                                                | Front drive shaft                | Check the front drive shaft. <Ref. to DS-25, INSPECTION, Front Drive Shaft.>                                     |
|                                                | Rear drive shaft                 | Check the rear drive shaft. <Ref. to DS-29, INSPECTION, Rear Drive Shaft.>                                       |
|                                                | Front hub unit bearing           | Check the front hub unit bearing. <Ref. to DS-18, INSPECTION, Front Hub Unit Bearing.>                           |
|                                                | Rear hub unit bearing            | Check the rear hub unit bearing. <Ref. to DS-21, INSPECTION, Rear Hub Unit Bearing.>                             |
| <b>Noise from the underbody</b>                | Wheel is out of balance.         | Check the wheel balance. <Ref. to WT-8, ADJUSTMENT, Wheel Balancing.>                                            |
|                                                | Front wheel alignment            | Check the front wheel alignment. <Ref. to FS-7, INSPECTION, Wheel Alignment.>                                    |
|                                                | Rear wheel alignment             | Check the rear wheel alignment. <Ref. to RS-8, INSPECTION, Wheel Alignment.>                                     |
|                                                | Front strut                      | Check the front strut. <Ref. to FS-23, INSPECTION, Front Strut.>                                                 |
|                                                | Rear shock absorber              | Check the rear shock absorber. <Ref. to RS-16, INSPECTION, Rear Shock Absorber.>                                 |